

The Boston Medical and Surgical Journal

Table of Contents

April 6, 1916

PREVENTIVE MEDICINE		HARVARD MEDICAL SCHOOL	
PRACTICAL POINTS IN THE PREVENTION OF ASIATIC CHOLERA. By Surgeon Allan J. McLaughlin, Boston.....	482	MEDICAL MEETING AT THE PETER BENT BRIGHAM HOSPITAL.....	511
ORIGINAL ARTICLES		BOOK REVIEWS	
FERMENTATIVE DIARRHEA IN INFANTS (CARBOHYDRATE FORM) By Lewis Webb Hill, M.D., Boston.....	487	The Obstetrical Quis for Nurses. By Hilda Elizabeth Carlson	512
THE ALCOHOLIC AS SEEN IN COURT. By Victor V. Anderson, M.D., Boston.....	492	Principles and Practice of Obstetrics. By Joseph B. De Lee, M.D.....	512
INDUSTRIAL MEDICAL SUPERVISION. By Arthur E. Emmons, Ed., M.D., Boston.....	495	Curschmann's Text Book of Nervous Diseases.....	512
THE TRUTH ABOUT SMALLPOX AND VACCINATION. By George W. Gay, M.D., Boston.....	500	EDITORIALS	
MEDICAL PROGRESS		INDUSTRIAL HEALTH INSURANCE.....	513
RECENT PROGRESS IN PSYCHIATRY. By Henry R. Stedman, M.D., Brookline, Mass., (Concluded).....	502	PECULIAR SOURCES OF FLEBISM.....	513
REPORT OF SOCIETIES		SMALLPOX AND ANTI-VACCINATION LEGISLATION.....	514
NEW ENGLAND PEDIATRIC SOCIETY. MEETING OF DEC. 10, 1915. 508		THE ALCOHOLIC IN COURT.....	515
CLINICAL CONFERENCE OF THE NEUROLOGICAL INSTITUTE, NEW YORK. MEETING OF DEC. 14, 1915.....	508	MEDICAL NOTES.....	515
		CORRESPONDENCE	
		A RARE DANGER OF ETHER ANESTHESIA. W. W. Keen, M.D....	517
		COCYGOVIRIA AS A MANIFESTATION OF SYPHILIS. Wm. Pearce	517
		Coxes, N.D.....	517
		MISCELLANY	
		NOTICES, RECENT DEATHS, ETC.....	518

Preventive Medicine.

PRACTICAL POINTS IN THE PREVENTION OF ASIATIC CHOLERA.

BY SURGEON ALLAN J. McLAUGHLIN, BOSTON,

United States Public Health Service; Commissioner of Health, Commonwealth of Massachusetts.

THE subject of cholera is so broad, the research work and knowledge acquired is so vast and its literature so voluminous, that it seems desirable to limit a paper of this character to the practical essentials in preventing the entrance of Asiatic cholera into clean territory and preventing its spread if it should succeed in passing quarantines. I will omit its interesting history, symptomatology and treatment, and confine myself to a discussion of the two points which are of the greatest practical significance, viz.: the cholera carrier and the bacteriologic diagnosis of Asiatic cholera.

With a thorough knowledge of the cholera carrier and the bacteriologic technic of cholera diagnosis, the prevention of cholera becomes easy, and all our efforts must be based logically on these two fundamentals.

(a) KNOWLEDGE OF CHOLERA CARRIERS.

Cholera carriers were first demonstrated in the Hamburg epidemic of 1893, and this demonstration was used by some to combat Koch's claim that the comma bacillus was the real cause of cholera. The presence of cholera vibrios in

healthy persons was looked upon by many as an interesting fact, with little epidemiologic significance, for years after the absolute specificity of the cholera vibrio had been universally accepted.

The writer had the privilege of observing the work of the German sanitary officers during the outbreak of cholera in Germany in 1905, and of working in the laboratories of the Institut für Infektionskrankheiten in Berlin. On the Stolpe estate, near Berlin, an outbreak of cholera appeared among Hungarian laborers—one hundred and ten persons were placed under observation—and examination of their stools showed five "bacillus carriers." During the months of September and October, 1905, two hundred and twelve cases of undoubted cholera were diagnosed bacteriologically, and about 12% of these were healthy bacillus carriers.

During the cholera epidemic in Manila in 1908, I found that the general impression was that "bacillus carriers" were interesting scientific curiosities, without much effect upon the spread of the disease. With my German experiences in mind, I was not ready to accept this position, and instituted a search for "carriers." When a case of cholera was found, the stools of all the inmates of the house and many of the inmates of the surrounding houses were examined. The amount of work which could be done was limited by lack of funds and personnel in the Bureau of Science, but in September, October and November three hundred and seventy-six healthy contacts were examined, and twenty-seven "carriers", or about 7%, were found.

The writer also believed that the bacillus carrier was the logical explanation of the mysterious outbreaks which occurred almost annually in Bilibid Prison. Bilibid Prison is one of the finest institutions of its kind in the world. From the standpoint of discipline and control of its inmates it stands almost unrivalled. There is absolute control of the food and water supply, and ordinarily no fresh milk is used in the institution. The appearance of cholera in such an institution seemed inexplicable, as the following extract from the Annual Report of the director of health for 1906 shows:

"A case in an institution which is practically cut off from the remainder of the world; where all food-stuffs are permitted to enter only after the most rigid inspection; where all food served that could likely convey cholera is cooked at all times, and, on account of dysentery, it is said that all drinking water was sterilized; it would seem that the routine precautions thus taken should also have afforded protection against cholera. The commencement of an outbreak in this insidious manner was puzzling to the sanitary authorities, and the prospects of combating a disease whose origin was so obscure were not encouraging."

When the writer took charge of the Bureau of Health, in August, 1908, cholera was present in Manila and epidemic in the surrounding provinces. In September the disease assumed epidemic proportions in Manila and broke out in Bilibid Prison. The precautions taken in Bilibid Prison were even more rigid than formerly, in regard to water and food, and the prohibition of vegetables, fruits and fresh milk. Each incoming prisoner was placed in quarantine for five days and his stools were examined for intestinal parasites, but not for cholera. Owing to the pressure of work incident to the epidemic it was deemed impracticable to examine the stools of over three thousand prisoners, but those of two hundred and sixty-four prisoners were examined, with the following results:

BILIBID PRISON.

Number of healthy persons examined	264
Number of persons carrying cholera vibrios	17
Percentage of bacillus carriers among healthy individuals	6.44

The outbreak was quickly suppressed in Bilibid Prison following an order by the writer to compel thorough disinfection of the hands under guard upon leaving the latrines and before eating.

These experiences prompted the writer to make the statement¹ that "The most important rôle in the transmission of cholera is played by the bacillus carrier." Subsequent experiences in the Philippines bear out this view, and in the last two years increased appropriations and personnel have enabled the Bureau of Science to extend greatly the search for carriers, with splendid results.²

The writer has never known a bacillus carrier to harbor cholera vibrios for longer than twenty days, and the great majority lose their vibrios in less than ten days. However, many observ-

ers have found them present for longer periods, although all agree that the long-time carrier is the exception and not the rule. The following are the longest cited by Pfeiffer³:

PERSISTENCE OF CHOLERA VIBRIOS IN STOOLS OF CONVALESCENTS, OR BACILLUS CARRIERS.

Name of Observer	Longest Duration of Days
Guttman	10
Lazarus and Pullicke	12
Michailow	13
Simonds	15
Rumpel	24
Rommelaere	47
Kolle	48
Donitz	49
Abel and Clausen	15
Pfeiffer	13
Bürgers ⁴	69

Gaffky,⁵ at the extraordinary session of the Permanent Committee of the International Sanitary Bureau, held at Paris, March, 1911, reported a case in Germany who, after six months of observation, still passed vibrios in his stools. This suggests that such chronic carriers may have infection of the gall-bladder and biliary passages. In fact, Zirolia,⁶ reports that in two cases vibrios reappeared in the stools after negative periods of twenty days and one month respectively. Such intermittency is scarcely possible without infection of the biliary apparatus. Zirolia observed further that, after a saline purgative, vibrios reappeared in a case which had been negative for three weeks. Kulescha⁷ found that the cholera vibrio could be detected in the gall-bladder in 10% of the cases, producing some lesions and propagating in the biliary passages.

Kulescha also reports a case of cholera, sick November, 1908, who recovered and was discharged from hospital in January, 1909, after having had vibrios continuously in his stools for fifty-seven days. He re-entered the hospital in October, 1909, with hepatic trouble, and died October 24, 1909. After autopsy cholera vibrios were found in the biliary passages. It is, of course, impossible to exclude the possibility of a re-infection, but Kulescha believes that the vibrios persisted from the time of his cholera illness in November, 1908.

It is, therefore, certain that we have long-time carriers in cholera as in typhoid, and this is probably due to infection of the biliary apparatus. These long-time carriers make a farce of the ordinary five-day quarantine detention without stools examination, which was considered formerly a sufficient guarantee for safe discharge from quarantine, provided no signs of illness developed. In the Philippines, in 1908 and 1909, the writer, as a requirement for discharge of contacts from quarantine, substituted a negative examination of the intestinal discharges for the ordinary five-day detention period.

In October, 1910, the writer recommended to the Surgeon-General that the intestinal discharges of all arrivals at United States ports,

from territory infected or suspected of being infected with cholera, should be examined bacteriologically, and that discharge from quarantine be made only after a negative result of the stools examination. On July 19, 1911, the Secretary of the Treasury promulgated a regulation providing for this additional safeguard.

Rapid methods of technic and an efficient system of collecting samples and handling the specimens make it possible for one person to examine from one hundred to one hundred and fifty stools per day.

This important advance in our methods of Asiatic cholera quarantine not only gives us an additional safeguard in preventing the entrance of vibrio-carriers, but makes possible the shortening of the period of detention from five days to two or three days.

Frank cases of cholera present little difficulty in diagnosis and are very much less of a menace in the spread of cholera than the carrier. Atypical cases, however, are much more serious as an epidemiological factor. The writer, in Manila, showed the frequency of these atypical cases in children,* and it is reasonably certain that they are common at all ages. These cases, like the healthy carriers, are unsuspected, and go undetected unless bacteriologic examination of the stools is made.

These facts concerning healthy carriers demonstrate clearly that the bacteriologic diagnosis is our sheet anchor in preventing cholera, and it is the only means of diagnosis upon which one can rely.

(b) BACTERIOLOGIC DIAGNOSIS OF ASIATIC CHOLERA.

The limits of this paper do not permit a detailed, complete description of the bacteriologic diagnosis of cholera. These details were given by the writer in this JOURNAL⁹ and in Reprint No. 53 of the Public Health Reports of the U. S. Public Health Service, November 4, 1910.

I desire to accentuate the simplicity of the technic of cholera diagnosis and to mention some of the useless procedures to be avoided.

The diagnostic procedures in Asiatic cholera may be limited to the securing of, from the feces, a discrete colony or pure culture of a vibrio and its agglutination by an anti-cholera serum of a high titer. The agglutination should be performed with a serum of a titer of at least 1 to 4000, and no weaker dilution than 1 to 1000 used as a final test. Pfeiffer's phenomenon, complement fixation, and other biologic reactions are useful aids, but are unnecessary for the simple diagnosis of cholera.

In frank cases of cholera in the first three days of the disease, direct smears of fecal material on ordinary agar plates will usually give discrete cholera colonies (within fifteen hours without enriching media). Enriching fluid should always be used, however, as the vibrios are often scarce in carriers or in cases of more than five days' duration. Very good results in detecting carriers are given by the peptone-

enriching media, according to the formula of the German Imperial Health Office.

Avoid the use of gelatin; it is difficult to handle, especially in the tropics, and has no compensating advantage. Use agar plates, ordinary 3% agar, neutral to phenolphthalein. The so-called cholera red reaction is valueless. Undoubted cholera strains sometimes fail to give it where certain brands of peptone are used. More important still, many non-cholera vibrios produce the cholera red in peptone solution.

Hanging drop procedures are time-consuming and of little value. You may discover that the organism is motile, but if it is a cholera vibrio its motility will prevent anything but a guess as to its morphology. Even if you have satisfied yourself that it is a motile vibrio, you must remember that there are dozens of motile vibrios morphologically and culturally indistinguishable from cholera.

The literature is full of the hemolytic type of cholera vibrios, and discussions of the so-called El Tor vibrio. These hemolytic strains of the German writers were practically all old laboratory cultures. Some reports have been made of peculiar reactions of some vibrios to serum of known agglutinative strength. These have either been old laboratory cultures or vibrios isolated from water which probably had been living in unfavorable environment. Many papers have been written which tended to show variation in the morphology of the cholera vibrio. These again were found in cultures kept on artificial media for weeks and months.

With Major E. R. Whitmore,¹⁰ U. S. Army, the writer made a long series of tests with many cholera and non-cholera vibrios in Manila. These were freshly isolated strains and represent what you are likely to find in actual conditions in epidemic times. We never found a freshly isolated cholera vibrio which was affected even in dilutions of 1 to 10 by any serum except anti-cholera serum. All freshly isolated cholera vibrios gave an instantaneous agglutination in anti-cholera serum 1 to 200 and in 1 to 1000 in one hour, strength of serum of a titer of at least 1 to 4000.

We never found a cholera vibrio freshly isolated from the human body which showed hemolytic properties, or any marked variation in morphology.

While these variations and peculiarities are found in laboratory cultures or strains isolated from water, the practical point is that you will find in the strains freshly isolated from the human body, normal, orthodox cholera vibrios, which will respond to your agglutination tests in a normal and orthodox manner.

In addition to ordinary laboratory equipment you will need for the bacteriologic diagnosis of cholera only the following:

Cholera material.
Agar plates.
Peptone solution.

Anti-cholera agglutinating serum, of a titer not less than 1-4000.

Your cholera material is planted in peptone solution and placed direct on agar plates. Plates are streaked from the peptone solution after three, six, or twelve hours. The vibrio colony is tested in drops of 1-200 cholera serum on a glass slide, for quick diagnosis, to be confirmed by a quantitative agglutination to the limit of agglutinability later.

IMPROVEMENT OF MEDIA.

One other advance in our methods of handling Asiatic cholera suspects has been made by Goldberger,¹¹ which promises to increase our efficiency in detecting Asiatic cholera carriers when making stool examinations on a large scale.

There has been no great change in the bacteriologic methods of Asiatic cholera diagnosis in the past ten years, and these methods are based upon the procedure of the German Imperial Health Office. They are efficient and adequate for the prompt diagnosis of Asiatic cholera, and the detection of cholera carriers, provided that there are plenty of vibrios in the stools and provided also that there is plenty of time to make the examination.

From the point of view of the practical quarantine officer the maximum protection of the public health must be afforded, with the minimum restriction of commerce. Here the time factor is of such importance that all cumbersome methods and unnecessary corroborative technic must be eliminated. The simplified and systematized methods successfully employed by the U. S. Public Health Service are efficient in detecting promptly Asiatic cholera cases or cholera carriers with numerous vibrios in their stools, but it is quite possible that the examination in the case of a carrier with very few vibrios in his discharge might prove negative.

As a time saving measure, test tubes are used instead of large flasks for the peptone solution. This necessitates that the amount of feces added to the tube must be small, and if the vibrios are very scarce a carrier might be recorded as negative. Large flasks and many platings are impracticable on a large scale, where the daily examinations may run into thousands. Goldberger's media permit the planting of relatively large quantities of feces, using the same convenient size of test tubes.

Goldberger suggests two enriching solutions, an alkaline egg peptone, and an alkaline meat infusion peptone. The cholera vibrio grows well in both solutions, though less luxuriantly than in ordinary cholera peptone. The multiplication of the ordinary fecal bacteria is markedly restrained, especially the colon bacillus. Goldberger's work shows that in his media the vibrios, if present even in small numbers, will increase and not be overgrown, even after seventy-two hours.

Goldberger's media were devised after a careful study and test of the various selective media suggested by Dieudonné, Neufeld and Worthe, Esch, Pilon, Crenderopoulo and Panayotatou, Krumwiede, Pratt and Grund, Hoffmann and Kitscher, Moldavan and others.

The addition of Goldberger's media to our equipment should make the passage of an Asiatic cholera carrier through our quarantines still more unlikely. It is true that these media have not yet been tested in actual field work, but the laboratory tests suggest that they are the most valuable addition to our cholera technic which has been made in recent years.

REFERENCES.

- ¹ McLaughlin, Allan J.: *Journal American Medical Association*, April 10, 1909, Vol. III.
- ² Munson, E. L., *Philippine Journal of Science*, January, 1915, Vol. x, No. 1.
- ³ Klin. Jahrbuch, 1908, Vol. xix, p. 482.
- ⁴ Hyg. Rundschau, February, 1910, Vol. xx, No. 4.
- ⁵ Report, Extraordinary Session, Permanent Committee International Bureau of Public Hygiene, March, 1911.
- ⁶ *Igiene Moderna*, Vol. III, No. 10, 1910.
- ⁷ Klin. Jahrbuch, Band xxiv, Heft 1.
- ⁸ McLaughlin, Allan J.: *Philippine Journal of Science*, Sect. B, 1909, Vol. IV, p. 363.
- ⁹ *Boston Man and Sea*, 1911, Vol. clxv, No. 15.
- ¹⁰ *The Philippine Journal of Science*, 1910, v, p. 391.
- ¹¹ Goldberger, Joseph: *Some New Cholera Selective Media*, Hygienic Laboratory, Bulletin No. 91, Washington, 1914.

RECENT LITERATURE ON THE TREATMENT OF CHOLERA.

RESULTS OF THE TREATMENT OF 69 CASES OF CHOLERA BY ROGERS' METHOD.

SIXTON (*Ind. Med. Gazette*, August, 1915) treated 69 cases of cholera during the summer of 1914, with a mortality of 21.7% as compared with a general mortality for the epidemic (1162 cases) of 76.1%. The treatment given was that advocated by Sir L. Rogers. To combat collapse intravenous injections of hypertonic salt solution were given. In the adult an initial injection of about three pints was usually required before a pulse of good tension appeared at the wrist, but in some cases as much as five pints were needed. When possible, the effect of the initial dose was kept up by rectal injections of isotonic saline given hourly. The indications for injection were weak pulse, cyanosis and restlessness (especially if accompanied with severe cramps), suppression of urine lasting more than 14 hours, severe vomiting and diarrhoea. Collapse was also combated with injections of strychnine, pituitrin and adrenalin hypodermically. Thirty-one of the writer's cases did not require saline injection. These cases were put at once on the permanganate treatment, the object of which is to destroy toxins in the bowel. All cases received this sooner or later. Two grains of potassium permanganate were given every fifteen minutes for eight doses, and then every half hour for four more doses if the stools were not already green. On the next day eight more doses were given at half-hour intervals, and in bad cases on the third day also.

The commonest complication observed in these cases was uremia, which was treated by injections of isotonic saline, digitalin, strychnine, adrenalin and pituitrin, also hot fomentations and cupping over the kidneys.

In the 38 severe cases (those requiring saline injection) the mortality was 37%, as compared with 83% among all untreated cases during the same period.

[L. D. C.]

Original Articles.

FERMENTATIVE DIARRHEA IN INFANTS (CARBOHYDRATE FORM).*

BY LEWIS WEBB HILL, M.D., BOSTON,

Graduate Assistant, Children's Hospital, Boston.

[From the Medical Service, Children's Hospital.]

THE diarrheas of infancy may be divided into three classes:

1. *Infectious Diarrhea*, due to infection of the intestinal mucous membrane with bacilli of the dysentery or streptococcus group, or possibly with the bacillus aerogenes capsulatus. A severe disease, accompanied usually by much prostration, and with pus, blood and mucus in the stools.

2. *Nervous Diarrhea*, due to increased intestinal peristalsis, caused by influences which disturb the nervous equilibrium of the child.

3. *Fermentative Diarrhea*, caused by the excessive decomposition of either carbohydrate or proteid material in the intestine. The word "fermentation" is here used in its broadest sense, synonymously with "decomposition."

(a) *Proteid form*: a condition due to the excessive decomposition of proteid in the intestine. No blood or pus usually in the stools, and not much prostration. The stools are brown, foul, rather large and mushy, and are always alkaline in reaction. The diarrhea usually clears up with a few days of low proteid and high carbohydrate diet. Not a very common condition.

(b) *Carbohydrate form*: the common diarrhea of infants; caused by excessive decomposition of carbohydrate in the intestine. It is with this last condition that I wish to deal.

Stools: The number of the stools varies. There may be as few as 3 or as many as 15. The stools may vary a good deal in appearance; if they are few in number they may be yellow and rather mushy and spongy; they may be bright yellow, of the consistency of scrambled eggs, with a good many small fat curds, or they may be bright green, and very loose and watery, with or without casein or fat curds. It is not exactly clear what causes the bright green color of the stools, but it is probably due to an oxidation of bilirubin to biliverdin. Normally, in the intestine the bilirubin present is reduced to hydrobilirubin, or remains as bilirubin, but under the influence of excessive fermentation it is oxidized to the bright green biliverdin. In diarrhea due to carbohydrate fermentation, there is rarely any blood present. The reaction of the stools is *always* acid, and a good nose can nearly always detect the characteristic odor of acetic or butyric acids.

There may be a good deal of tenesmus and straining, and, in severe cases, even prolapse of the rectum. The general condition of the child, in the milder cases, may be good, or in the more severe cases there may be a good deal of prostration, with moderate fever, seldom over 101°. There may be vomiting, but this is not a prominent symptom, and except in the more severe cases the stomach is not particularly irritable. The buttocks are usually red and irritated.

The *diagnosis* of diarrhea due to carbohydrate fermentation is usually not difficult. It must be remembered that the condition is due to one thing: *a fermentation of carbohydrate in the intestine and excessive acid production, with consequent irritation to the mucosa, and increased peristalsis.* Hence the stools are always acid. Occasionally the more serious condition, infectious diarrhea, may start in with fermentation, and the only way to distinguish a case of this sort is to watch it for a few days. If it is one of infectious diarrhea, the temperature generally continues elevated, and blood usually appears in the stools. Ordinarily, it is not difficult to distinguish between the two, and nearly all cases of diarrhea with strongly acid stools are of the carbohydrate type.

Etiology. In the infant's intestine there are always two forces working against each other: decomposition of carbohydrate and of protein. If the former preponderates the stools are acid; if the latter, they are alkaline. In a healthy bottle-fed child there is a balance between the two: the stools may be slightly acid, slightly alkaline, or neutral, and if any one of these three conditions obtains, there is no diarrhea—it is only when the balance is upset that trouble results. Many factors enter into the abnormal fermentation of carbohydrate in the intestine, and it is probable that no one factor is the cause; it is rather a resultant of several conditions, and only the more important ones will be taken up in this paper. In the words of the late Christian Herter:¹ "The character of the products formed in the digestive tract under the influence of micro-organisms is influenced by a variety of conditions: by the chemical nature of the food, by the quantity and composition of the digestive juices, by the rate of absorption, and by the state of the motor functions of the stomach and intestine. It does not require a highly developed imagination to see how complex must be the conditions which enter into these bacterial activities, and how hopeless is the task of tracing the precise influence of each of these factors."

In any discussion of the etiology of fermentative diarrhea in infants, heat occupies a prominent place: it favors the growth of deleterious organisms in the milk ingested, and it also lowers the resistance of the child. It has always seemed to me that the practice that so many of our foreign population have, of dressing their

* Read at a meeting of the New England Pediatric Society, Dec. 10, 1915.

babies too warmly in the hot weather, is also an influence in causing diarrhea.

Food. The three conditions in the food that are important are the following:

1. Too high a sugar percentage in the food. In this connection it should be remembered that the different sugars are not alike in the ease with which they are fermented, and that the maltose is the least easily fermentable. Also, the relation between the sugar and protein in the food is important; a high sugar and a relative low protein percentage favors acid production.

2. Too much food at a feeding, thus causing an excessive amount of carbohydrate to be thrown into the intestine at one time. It cannot be absorbed, and what is not absorbed, is likely to ferment.

3. Bad milk. In summer, the possibilities of milk infection are, of course, great. The ordinary lactic acid fermentation, or "souring," of milk, does no real harm to the milk as a food, and milk "soured" with the lactic acid organism does not cause diarrhea. Lactic acid in small amounts is not harmful to the intestine, and in the ordinary "souring" of milk the fermentation does not go beyond the lactic acid stage. The danger comes when such organisms as *b. coli*, *b. acidophilus*, *b. proteus*, etc., get into the milk. These organisms produce a different sort of fermentation than does the lactic acid bacillus, and form the volatile fatty acids, such as formic, acetic, and butyric, from the carbohydrate in the milk, and, of course, carry on their activities in the intestine, although a good many of them are probably killed before they reach the intestine, by the hydrochloric acid of the stomach.

It is these acids, especially acetic, which are harmful. It is probable that no one micro-organism is entirely responsible for the formation of volatile fatty acids from sugars in the intestine, the bacterial flora there being so varied, and the possibilities of a varied milk infection being so great, that it would be hard indeed, to lay the blame at the door of one organism. The bacillus proteus, the bacillus perfringens (Tissier), the bacillus Flügge of the Germans, and the bacillus aerogenes capsulatus have all been given importance by different investigators, and by different pediatric schools—but it may be said that the problem is an extremely complicated one, and that our knowledge of the exact parts played by these various organisms is as yet very imperfect.

From a study of the literature and from my own observations on the Boston Floating Hospital and in the Out-Patient Department of the Children's Hospital it seems fair to assert the following regarding the cause of (carbohydrate) fermental diarrhea:

Fermental diarrhea is due to excessive production of volatile fatty acids by bacterial fermentation of carbohydrate in the intestine. A number of factors cooperate in causing it: a

food excessively rich in carbohydrate, or a food in which the ratio of the carbohydrate to the protein is too high, or a food fed in excessively large amounts. The powers of digestion and absorption of the individual baby, and the relation between the digestive juices, also play an important rôle. The normal flora of the intestine may, in summer time, be greatly augmented by the introduction of more bacteria of the same or different sorts, in the milk ingested, and even if there is only a relatively small amount of carbohydrate present in the intestine, it ferments, due to the greater variety and mass of bacteria.

The chemistry of fermental diarrhea is most interesting, and it is necessary to understand the essential chemical processes at work, in order to understand the principles of treatment. As we have said before, the two great antagonistic processes in the intestine are the breaking down of carbohydrate material with acids end products, and the breaking down of proteid material with alkaline end products. Normally, in the artificially fed infant, these two processes just about balance each other, and if one greatly preponderates, trouble usually results. When excessive fermentation of carbohydrate takes place, the place of the greatest acidity is probably in the large intestine, although the small intestine is involved to a lesser extent. The acids are formed mostly in the intestine, and to a very slight extent in the stomach, as the hydrochloric acid of the stomach contents has a very powerful anti-bacterial action, and the small amount of volatile fatty acid formed there is due to enzyme and not to bacterial activity.

The acids formed may be of two sorts:

1. The non-volatile acids, represented chiefly by lactic and succinic acids, neither of which is particularly harmful.

2. The volatile fatty acids, represented by the acid series which starts with formic acid, CH_2O_2 and runs up to cerotic, $\text{C}_{26}\text{H}_{52}\text{O}_2$. The acids which are contained in fats (palmitic, stearic, and oleic) are of this series. There are 19 acids in the series, but it is unlikely that the higher members of the series are formed in the intestine. The most important ones are formic, acetic, propionic, butyric, valeric, capronic, caprylic, and caprinic.

Probably most of the acids arise from the carbohydrate, but some of the higher ones undoubtedly come from the fat. It is hard to say to just what extent these higher acids, arising from the fat, may be broken down to the lower ones, but probably to no great extent, and for all practical purposes it is safe to say that nearly all the harmful acids come from the carbohydrate. The most harmful of these acids is probably acetic. Small amounts of acetone and formaldehyde are also probably formed, both of which substances, if present in any considerable amount, are tremendously irritating to the intestine. The sugar molecule contains so many

carbon atoms that a very great number of substances may be formed from it. It is probable that almost always all the sugar in the intestine is either absorbed or split up into acids, for it is rare to find sugar in the stools of babies, no matter on how high a sugar percentage they are being fed.

The first action of the volatile fatty acids is to irritate the intestine, and to cause an increased secretion of mucus and an increased peristalsis, with frequent loose stools. Given a diarrhea with increased peristalsis and frequent watery movements, the absorption of all the food elements is lessened on account of the increased peristalsis and larger amount of fecal material lost. In a three-day metabolism period on a six-months old baby who had 12 watery green acid movements during the period, Talbot and Hill² found that the weight of the dried stool was nearly twice as much as under ordinary conditions. The neutral fat in the stool rose from 1.14 to 6.00 gm., the soaps and fatty acids from 5.78 to 8.46 gm., the ash from 5.3 to 7.17 gm., and the nitrogen from 1.11 to 2.01 gm. The percentage absorbed dropped as follows: Fat, 90 to 74%; nitrogen, 90 to 79%; ash, 68 to 43%.

Jundell,³ also gives figures very close to these, and found that in addition to a poor absorption of fat, there was also a greatly diminished power to split fat. There are also other factors than increased peristalsis which cause lessened absorption. These apply particularly to the fats and to the salts.

In the normal digestion of fat, the prevailing view is at the present that the neutral fat is split by the pancreatic lipase (steapsin) into glycerol and fatty acids. Part of these acids are dissolved in the bile and absorbed as fatty acids. The rest unite with the alkali of the pancreatic juice to form soluble soaps. These, with the acid of the bile in forming an emulsion, are absorbed.

In an excessively acid condition of the intestine this procedure may be interfered with in several ways. In the first place, bile is a *notoriously unstable substance, especially in an acid medium, and it is very probable that it is decomposed by the acids present and thus rendered useless in the emulsification of the fat.* Also, it is a fact that no emulsion of fat or soap can exist in a strongly acid medium, so with these two factors at work it is hard to see how the absorption of fat can proceed. One sees a good many infants who have not a true diarrhea, but four or five rather spongy, acid stools every day, with a good deal of soap in the stool—and when the carbohydrate intake is cut down the fat absorption becomes better. It is likely that the poor absorption of fat in these cases is due to the two factors discussed above: decomposition of the bile, and poor emulsification, due to a too strongly acid intestinal contents.

The relation of the fats to the alkaline earths, calcium and magnesium, and to the alkalis, so-

dium and potassium, is an interesting one. It is possible for four different kinds of soaps to be formed in the intestine: those of calcium and magnesium, and those of sodium and potassium. The two former are insoluble, and difficult of absorption, and the two latter soluble, and easy of absorption. It is conceivable that in the neutralization of the lower volatile fatty acids formed, all the sodium and potassium, which are the strongest bases, is used up, thus leaving the calcium and magnesium present to combine with the higher fatty acids to form insoluble soaps which cannot be absorbed. It is not certain what all the causes are which operate to induce the formation of an excess of calcium and magnesium soaps, but it is true that the more of these soaps that are formed, the less fat is absorbed. Following this reasoning, *it would seem that it is a mistake to have any lime water in the milk when there is fat intolerance.*

An important thing in fermental diarrhea is the loss of alkali. This may be caused by a combination of different factors. There is a loss of calcium and magnesium in the production of an excessive amount of soaps, there is a loss due simply to increased peristalsis, and there is a loss due to the excessive acid condition of the intestine, which stimulates the pancreas and the secreting glands of the intestine, causing a great outpouring of alkaline secretion, which tries to do its part in neutralizing the acids present. Talbot and Hill⁴ found that in a six-months old baby on a normal diet there was an alkali retention of from 1 to 2 gm. a day, but when this same baby developed fermental diarrhea, due to the feeding of an excessive sugar percentage, there was a negative alkali balance, with a loss of about .20 gm. a day. Any long continued loss of salts does a great deal of harm to the growing organism, but it is probable that the temporary loss during an attack of fermental diarrhea is rapidly compensated for by an increased retention after the diarrhea has stopped.

TREATMENT.

It is obvious that the one important principle in the treatment of a case of fermentative diarrhea due to carbohydrate, is to give a food low in carbohydrate until normal conditions are restored. If at the same time this food can contain a considerable amount of protein, in a form which is easily digestible, a great deal will have been gained, for in this way the reaction of the intestinal contents can be changed from acid to alkaline, by the alkaline end products of protein disintegration, and the source of the diarrhea removed. It is the high protein and relatively low carbohydrate percentage that has made the "eiweiss" milk of Finkelstein, and its various modifications valuable. The great drawback to these is their difficulty of preparation. The use of skim milk dilutions, with the addition of powdered casein, meets the indication in treating fermental diarrhea, and such mixtures are in-

finitely more simple of preparation than any of the "eiweiss" milk preparations. During the past summer I have treated my cases of fermental diarrhea in this way. A soluble form of "calcium casein" was used, and found very satisfactory, the mixtures being very easy of preparation and the babies taking it very well. For babies under six months old a mixture of skim milk and water is used, with enough "calcium casein" added to bring the protein percentage up to 2.60%—giving a formula: Fat, .25; sugar, 2.25; protein, 2.60. For babies over six months old the same dilution of casein is added to 3.00%. One-third of an ounce of powdered casein in a mixture of 16 oz. of skim milk and water is used, but the powdered milk and 16 oz. of water, raises the protein percentage to 2.60%. In a 48 oz. mixture (24 oz. skim milk and 24 oz. water) 2/3 oz. of powdered casein raises the protein to 3.00%. The amount given at each feeding depends of course on the individual baby, but in general, slightly smaller amounts are given than would be given to a well baby of the same age and weight. The usual course of a case is that after a day or two of casein milk feeding the stools begin to diminish in number, become more yellow and after three to five days become pasty, light yellowish brown in color, and alkaline in reaction. After the diarrhea has stopped, whole milk is added to make the fat percentage from 1 to 2%, and if this is borne well, in 2 or 3 days enough sugar is added to make the sugar percentage about 3.50%. Malt sugar is the best sugar to use, as it ferments less easily than do the other sugars. Sometimes the powdered casein is continued, sometimes not, depending on the case, but I have not fed any case on it for longer than 10 days. If the addition of the malt sugar causes no diarrhea, a gradual addition of sugar, and a return to the normal feeding is made. No drugs should be given to these cases. Drugs do the condition no good: it is simply a question of reestablishing the acid-alkali balance of the intestine. I do not believe in an initial purge with castor oil. The irritating acids that have formed are quite enough of a cathartic and it is adding insult to injury to irritate the intestine further. If there is a great deal of tenesmus and discomfort at defecation, and a great many stools, it is wise to give small doses of opium, but other than this no drugs are needed. It would be tedious to give a number of case reports in detail, as most of the cases are very much the same, but a brief summary may be of interest. Thirty-five cases of fermental diarrhea were treated in the manner above described: all but two did well—one of these could not keep the high protein milk on his stomach, the other kept it down, but it did him no good. The remaining cases were most satisfactory. Most of the cases were babies under a year old, and it is surprising how they held their weight while being treated for diarrhea with the high protein milk: indeed a good many actually

gained. The average time of casein milk feeding was about five days: most cases began to improve in 48 hours.

On the whole I am convinced that when a high protein and a low carbohydrate milk is indicated, the best and simplest way of giving it is with skim milk and water dilution, made up to the required protein percentage by the addition of soluble "calcium casein."

CASE REPORTS.

CASE 1. July 27, 1915, female, 15 mos., weight 19 lbs. 5 oz.; 3 loose, brownish, sour stools yesterday.

Treatment: skim milk, 24 oz., water, 24 oz., F. 25%, C. 2.25%, P. 3.00%; casein 2/3 oz., 6 F. of 8 oz. July 31, weight 19 lbs. 12 oz. (gain 7 oz.) Stools are normal, and rather hard and yellow, Bowels move once a day.

Treatment: Whole milk with half the cream removed, zwiebach, farina, oat jelly, soup. A very mild case, which did not need to be kept on the casein milk diet very long, and which was easily returned to normal diet without any recurrence of diarrhea.

CASE 2. July 26, 1915, 1915, male 2 mos., weight 9 lbs. 4 oz.; 3 or 4 bright green, loose, very sour stools a day. Is taking F. 2.50%, C. 6.00%, P. 1.00%, 4 oz. every 2½ hours.

Treatment: Continue the same formula and give the same quantity at each feeding, but add 1/3 oz. of casein to the day's feeding, making the protein 2.50%. Aug. 2, weight 9 lbs. 15 oz. (gain 11 oz.) After a day's feeding on the high protein milk the stools changed from green to yellow, and he had only two a day. Two days ago all the casein was used up, and today his stool was green, loose and sour again.

Treatment: Continue the same as before, with casein milk. Aug. 16, used the high casein milk for two days, diarrhea promptly cleared up, and is now having two normal stools a day. A case illustrating the importance of the relation between the carbohydrate and the protein, for no change was made in the feeding in this case except to increase the protein from 1.00% to 2.50%.

CASE 3. July 31, 1915, male, 7 mos., weight 11 lbs. 11 oz.; 5 loose, spongy, sour smelling stools yesterday, with many small fat curds. Is taking: F. 2.50%, C. 4.00% lactose, P. 1.80%, starch, 75, 7 F. 6 oz. 2.00% maltose

Treatment: F. 1.50%, C. 2.00% lactose, P. 2.80% 1.00% maltose,

(powdered casein) 7 F. 6 oz. Aug. 3, weight 11 lbs. 6 oz. (loss 5 oz.) 5 stools yesterday, yellowish and full of small soft curds, exactly the same as at the last visit. No improvement.

Treatment: Continue the same. Aug. 9, 4 stools yesterday; brown in color, rather loose. Neutral reaction.

Treatment: Continue the same. Aug. 16, fed the casein milk for two days, and stools became normal. Is now having two normal yellow stools a day; weight 11 lbs. 12 oz. (gain 1 oz.)

CASE 4. Female, 11 mos., weight 21 lbs. 10 oz. Bowels have been loose for a week. For the last

2 or 3 days has been having 15 to 20 green, curdy stools a day.

Treatment: skim milk, 32 oz., water, 8 oz., F. 25%, C. 3.00%, P. 2.90%; lime water, 8 oz., 6 F. 8 oz., casein 1/3 oz. Aug. 6, vomited the casein milk, so mother stopped it after a day and a half. Weight 21 lbs. 11 oz. (gain 1 oz.)

Treatment: skim milk, 24 oz., barley water, 24 oz., 6 F. 8 oz. Sept. 4, mother says that the diarrhea stopped in a few days after this diet was begun, and that she then resumed the regular diet of the child. One of the very few cases that could not take powdered casein.

CASE 5. Aug. 11, 1915, female, 18 mos., weight 16 lbs. 8 oz.; 7 yellow stools yesterday. A little tinge of blood in one.

Treatment: skim milk, 24 oz., F. 25%, C. 2.25%, P. 2.40%; water, 24 oz., 6 F. 8 oz., casein, 1/3 oz. Aug. 16. Yesterday had 3 normal looking movements, and the day before yesterday only one.

Treatment: whole milk, 36 oz., water, 12 oz., F. 2.00%, C. 2.25%, P. 3.20%; casein, 1/3 oz., 6 F. 8 oz.

CASE 6. Aug. 9, 1915, female, 3 mos., weight 10 lbs. 10 oz. Yesterday had 18 green loose movements during the day, and three during the night. Temperature 100.

Treatment: skim milk, 16 oz., water, 16 oz., F. 25%, C. 2.25%, P. 2.60%; casein, 1/3 oz., 8 F. 4 oz. August 12, weight 10 lbs. 15 oz. (gain 5 oz.) 5 stools yesterday, 1 yellow and 2 green.

Treatment: Continue same. Aug. 16, weight 11 lbs. 2 oz. (gain 3 oz.) 3 stools yesterday, 1 yellow and 2 green.

Treatment: whole milk, 16 oz., water, 16 oz., F. 2.00%, C. 2.25%, P. 2.60%; casein, 1/3 oz., 8 F. 4 oz. Aug. 19, weight 11 lbs. 6 oz. (gain 4 oz.) One yellow formed stool a day.

Treatment: whole milk, 18 oz., water, 18 oz., F. 2.00%, C. 5.8%, P. 1.60%; dextrin-maltose, 3 tbsp., 8 F. 4 1/2 oz.

CASE 7. Female, 1 year, weight 11 lbs. 14 oz. Convalescent from pneumonia. Has had 9 or 10 loose, green, slimy movements for the last 2 or 3 days. Is taking: F. 1.6%, C. 6.00%, P. 1.30%, 6 F. 8 oz.

Treatment: skim milk, 24 oz., water, 24 oz., F. 25%, C. 2.25%, P. 2.40%; casein, 1/3 oz., 6 F. 8 oz. August 16. The day after she began taking the high protein milk the diarrhea stopped, and the color changed from green to yellow. Had 4 stools yesterday and only 1 today; weight 12 lbs. 5 oz. (gain 1 lb. 7 oz.)

Treatment: whole milk, 27 oz., water, 21 oz., F. 2.25%, C. 2.70%, P. 2.60%; casein, 1/3 oz., 6 F. 8 oz.

CASE 8. Aug. 16, male, 1 year, weight 20 lbs. 8 oz. For the last 3 or 4 days has had 4 or 5 loose, green movements a day.

Treatment: skim milk, 24 oz., water, 24 oz., F. 25%, C. 2.25%, P. 2.40%; casein, 1/3 oz., 6 F. 8 oz. August 19, weight 20 lbs. 9 oz. (gain 1 oz.) 4 stools yesterday. Stool is rather light green, no mucus, no curds. Not a bad looking stool, but still not normal.

Treatment: whole milk, 18 oz., water, 30 oz., F. 1.50%, C. 1.75%, P. 2.60%; casein, 2/3 oz. 6 F.

8 oz. Aug. 23, 3 stools yesterday; greenish, but not loose; weight 20 lbs. 7 oz. (loss 3 oz.)

Treatment: same. Aug. 26. Diarrhea has stopped. Is constipated now. One normal movement a day.

Treatment: whole milk, 24 oz., barley water, 24 oz. for one day, then whole milk, 40 oz., barley water, 8 oz. with crackers, farina and zwieback.

CASE 9. Aug. 14, female, 14 mos., weight 20 lbs. Has had 7 or 8 green movements for the last 3 or 4 days.

Treatment: skim milk, 4 oz., water, 4 oz., F. 25%, C. 2.25%, P. 2.40%; casein, 3/4 every three hours.

Aug. 17. Diarrhea stopped after she had had several bottles of the high protein milk. Stools are normal.

Treatment: skim milk, barley and oat jelly, dry bread.

CASE 10. Aug. 25, male, 13 mos., weight 17 lbs. 12 oz. Diarrhea for a week, 10-12 stools a day; loose, bright green, and full of curds and mucus. Is taking F. 3.00%, C. 6.00%, P. 2.00%, with bread and crackers.

Treatment: skim milk, 24 oz., water, 24 oz., F. 25%, C. 2.25%, P. 3.00%; casein, 2/3 oz., 6 F. 8 oz. Aug. 30. Eight or nine stools yesterday, but they were small and not very loose. No green stools for two days. The stool brought in is yellow, pasty, alkaline—a normal looking stool. Had only one stool today; weight 18 lbs. 4 oz. (gain 8 oz.)

Treatment: whole milk, 24 oz., water 24 oz., F. 2.00%, C. 3.00%, P. 3.00%; dextrin-maltose, 1 tbsp., casein, 2/3 oz., 6 F. 8 oz. September 3, weight 20 lbs. (gain 1 lb. 12 oz.) Doing very well. Has 3 or 4 light colored, pasty stools a day.

Treatment: whole milk, 32 oz., barley water, 16 oz., 6 F. 8 oz., with farina, oat jelly, and crackers. A very satisfactory case, especially as far as gain in weight was concerned.

CASE 11. Aug. 24, female, 5 mos., weight 10 lbs. 12 oz. Has been having 5 or 6 loose green movements a day, with many curds. Mother made a mistake in mixing her modification, and has been using 6 tbsp. of milk sugar to the day's feeding instead of 3, thus giving the baby over 8.00% of sugar.

Treatment: skim milk, 24 oz., water, 24 oz., F. 25%, C. 2.25%, P. 3.00%; casein 2/3 oz., 6 oz. 7 F. Aug. 28, four stools yesterday and 4 the day before. Stool brought in is large, not loose, pasty, grayish green in color; weight 10 lbs. 14 oz. (gain 2 oz.)

Treatment: whole milk, 24 oz., water 24 oz., F. 2.00%, C. 4.6%, P. 1.60%; lactose, 3 tbsp., 6 oz., 7 F. Sept. 1. Stools are normal, yellow, only 2 or 3 a day.

Treatment: whole milk, 24 oz., water, 24 oz., F. 2.00%, C. 4.6%, P. 1.60%; lactose, 3 tabs., 6 oz., 7 F.

CASE 12. Sept. 2, male, 6 mos., weight 15 lbs. 8 oz. Has had 5 or 6 green slimy movements a day, for the last few days. Is taking: F. 3.00%, C. 5.50%, P. 1.50%, 7 F. 7 oz.

Treatment: skim milk, 24 oz., water, 24 oz. F. 25%, C. 2.25%, P. 3.00%; casein, 2/3 oz. 7 F. 7 oz. Sept. 7, weight 15 lbs. 10 oz. (gain 2 oz.) After a day and a half of feeding the high protein milk,

the loose movements stopped, and the baby is now having one normal yellow stool a day.
Treatment: whole milk, 30 oz., barley water, 10 oz., F. 2.6%, C. 5.50%, P. 2.3%; lime water, 8 oz., starch, 40%, 7 F. 7 oz., lactose, 3 tbsp.

CASE 13. Sept. 3, male, 7 mos., weight 14 lbs. 5 oz. Yesterday had 5 or 6 loose green stools. Is taking F. 2.00%, C. 5.50%, P. 1.60%, 7 F. 5½ oz. *Treatment:* skim milk, 24 oz., water, 24 oz., F. .25%, C. 2.25%, P. 3.00%; casein, 2/3 oz., 7 F. 6 oz. September 7, weight 14 lbs. 4 oz. (loss 1 oz.) After about 48 hours of the casein milk feeding the stools became normal, and he is now having 2-3 yellow stools a day. The stool brought in is yellow brown, saline like, alkaline in reaction—a typical high protein stool.
Treatment: whole milk, 12 oz., skim milk, 12 oz., F. 1.00%, C. 2.25%, P. 3.00%; water 24 oz., 6 F. 8 oz., casein 2/3 oz.

CASE 14. Aug. 30, female, 3 mos., weight 11 lbs. 14 oz. Had 4 green stools day before yesterday, and 3 yesterday. The stool brought in is green, loose, and has a strongly acid reaction.
Treatment: skim milk, 16 oz., F. .25%, C. 2.25%, P. 2.40%; water, 16 oz., 8 F. 4 oz., casein, 1/3 oz. Sept. 4, weight 12 lbs. 7 oz. (gain 9 oz.) Doing very well, has 2 or 3 good stools a day. The stool brought in is yellowish brown, pasty and has a strong alkaline reaction. Baby in splendid condition.

Treatment: whole milk, 8 oz., skim milk, 8 oz., F. 1.00%, C. 3.45%, P. 2.40%; water, 16 oz., 8 F. 4 oz., lactose, 1 tbsp., casein, 1/3 oz. Sept. 10, weight 12 lbs. 13 oz. (gain 6 oz.) Has 2 or 3 yellow pasty stools every day.
Treatment: whole milk, 18 oz., F. 2.00%, C. 3.25%, P. 1.60%; water, 18 oz., 8 F. 4½ oz., dextri-maltose, 1 tbsp.

CASE 15. Aug. 24, female, 11 mos., weight 16 lbs. 8 oz. Had had diarrhea for the last two weeks; 6 or 7 loose green movements a day. The case was seen by the family physician two days before entrance and was put on 6% lactose solution, with 1.5% barley starch. The movements did not improve and the stool brought in was small and green with a large amount of mucus.

Treatment: skim milk, 24 oz., water, 24 oz., F. .25%, C. 2.25%, P. 3.00%; casein, 2/3 oz., 6 F. 8 oz. Aug. 28, three stools yesterday, yellow and normal. The stools began to get better after about two days on the high protein milk. The stool brought in is bright yellow, rather hard, normal.
Treatment: whole milk, 24 oz., F. 2.00%, C. 3.00%, P. 1.60%; water 24 oz., 6 F. 8 oz., dextri-maltose, 1 tbsp.

NOTE.—In the above list of cases, not all the cases treated are reported, as many of them are practically identical.

REFERENCES.

- ¹ Herter: Pathological Chemistry, 1902.
- ² Talbot, F. B., and Hill, L. W.: The Influence of Lactose on the Metabolism of an Infant. American Jour. Diseases of Children, Vol. 8, p. 218, September, 1914.
- ³ Jundell. Untersuchungen über den Stoffwechsel bei der Dyspepsie und der alimentären Intoxikation. Zeitschr. f. Kinderheilk., Bd. 8, Heft 2.
- ⁴ Loc. cit.

THE ALCOHOLIC AS SEEN IN COURT.

BY VICTOR V. ANDERSON, M.D., MUNICIPAL COURT, BOSTON.

THIS study was originally undertaken with the aim in view of getting at the problem presented to the court by the chronic alcoholics; the so-called "old rounders," who are repeatedly arrested for drunkenness and seem more or less unmodified by any form of treatment; who serve many terms in the House of Correction, in jail, or at State Farm, but invariably find their way back into court when turned out into society. This report is based upon investigation of one hundred such cases, chosen at random from habitual and periodic drinkers (fifty of each), who have been repeatedly arrested for drunkenness.

It is assumed that these one hundred cases fairly well represent the class of alcoholics just referred to, and are average cases; many more serious cases, individuals arrested fifty, one hundred and more times, were known not to be included in this group. The occasional drinker, the mild social drinker, and such, who appear in large numbers in court and profit by the lessons learned from arrest and detention, or judicial reprimand, or probation, or short term sentences, do not form difficult problems, and may for the practical purposes of this paper be wholly disregarded.

The following table shows that each individual averaged a little more than seventeen arrests apiece; though some were known to have old records that were not obtainable:

STATISTICS OF ARRESTS.

Number of Cases.	Number of Times Each Individual Was Arrested.	Total Number of Arrests of Group.
50 steady drinkers.....	21	1050
50 periodic drinkers.....	14.5	725
100 alcoholics.....	17.75	1775

The frequency of arrests serves to call attention to the seriousness of the situation from the standpoint of the court. These 100 alcoholics totaled 1775 arrests. It is obvious that the usual methods of punishment had failed to modify their alcoholic tendencies, for after short terms of imprisonment and then freedom, they appear again in court to go through the same procedure over and over; off to prison, out in society, back into court, and so the process is repeated as the years go by. Eventually they become a burden to the court and needlessly clog its machinery.

If we now turn to another aspect of the problem, their ability to support themselves out in society, we find the following facts:

STATISTICS OF ECONOMIC EFFICIENCY.

	Percent.
Steadily employed.....	10
Irregularly employed.....	40
Odd jobs.....	18
Do not work at all.....	13
Housework at home (women).....	19

100

Only 10% were steadily employed. Practically one-half of these 100 cases were not self-supporting.

	Percent.
Self-supporting	51
Not self-supporting.....	49
	<hr/> 100

Almost universally now are earnest students of the situation attributing society's failure in properly handling the alcoholics to the fact that their physical and mental conditions have been disregarded. The nervous system of everyone of these 100 hundred cases showed some impairment, whether it be of sensory capacity, vision, hearing, touch, etc., or disturbed reflexes, or poor motor co-ordination, or muscular tremors, or what; while the mental inferiority was evident in more than three-fourths of the cases, as the following table will show:

TABLE OF MENTAL LEVEL AS SHOWN BY MENTAL TESTS.

Mental Level.	Number of Cases.
Eight to nine years.....	15
Nine to ten years.....	21
Ten to twelve years.....	20
Sub-normal	21
Adult	23
	<hr/> 100

77% showed an inferior substandard mentality, while 56% had a mental level below the limit of 12 years.

Finally, the following table of diagnoses will explain the most important causative factor underlying the frequency of arrest, the economic inefficiency, and the low level of mentality of these 100 cases:

TABLE OF DIAGNOSES.

Feeble-mindedness	37
Insanity	7
Epilepsy	7
Alcoholic deterioration	17
Psychopathic constitution	32
	<hr/> 100

These are all essentially medical problems, and might more profitably be handled as such.

CONCLUSIONS.

We find that the chronic alcoholics spend a good proportion of their time in and out of institutions. When out in society, in not more than half of the cases are they able to support themselves. They suffer from physical and mental

handicaps, that are in general considered as serious medical problems. They are in need of such care and treatment as are given to those suffering from physical and mental diseases or defects, rather than the ordinary penal treatment in the past afforded them.

The alcoholic himself would be better off, for he would be handled in the light of what he is and what he needs, rather than what he has done; the best interests of social welfare would be better served, in that society would be more securely protected from those that are a menace and a burden; and, finally, there would be an economic saving, in that the cost for maintaining these individuals in penal institutions, handling them over and over in the courts, and supporting them out in society, would go towards building them up physically and mentally and so equipping and training them that they may eventually become self-supporting.

Such a plan would not be revolutionary and would have no reference to the handling of drunkenness in general, but would simply provide ample farm-colony and hospital facilities for those chronic alcoholics whom the courts may consider in need of prolonged confinement and treatment.

A further analysis of these 100 cases discloses two distinct types, important to recognize, essentially different in makeup, and apparently requiring different methods of handling:

- (a) The Steady Drinker.
- (b) The Periodic Drinker.

The steady drinker has been in the habit of imbibing alcohol more or less steadily, and perhaps in small quantities, for a prolonged period of years. He shows an insidious, progressive impairment of his nervous system and lowering of the functional activities of the entire organism.

"The periodic drinker has drink paroxysms which subside and are followed by periods of sanity and rational thought and conduct. Then suddenly the storm breaks out again, and he drinks to great stupor; from this he recovers only to have another paroxysm." In the intervals between "sprees" he may not touch alcohol at all, and remains for months without it. He is a neurotic individual with a nervous system that is unstable and poorly balanced; which instability is the prime factor underlying his drinking habits and his impulsive conduct in general.

The following table illustrates very clearly the difference in the makeup of these two types of alcoholics:

MENTAL LEVEL OF ONE HUNDRED ALCOHOLICS.

Level of Intelligence.....	8-9 yrs.	9-10 yrs.	10-12 yrs.	Sub-normal	Adult
50 steady drinkers.....	15 (30%)	19 (38%)	9 (18%)	5 (10%)	2 (4%)
50 periodic drinkers.....	—	2 (4%)	11 (22%)	16 (32%)	21 (42%)
Totals	15	21	20	21	23
					100

Comparing the two types from the standpoint of intelligence, we find from above table that only 14% of the steady drinkers have a mental level above 12 years, while 74% of the periodic drinkers are above this level; that 86% of the steady drinkers have a mental level below 12 years, while only 26% of the periodic drinkers possess so low a grade of intelligence. The steady drinkers in general show a low level of intelligence; though adult in years and in physical development fully grown men and women, still they have the mental capacity of children. Is it any wonder that they fail to measure up to the standards set for them? Possessing as they do a defective or deteriorating mentality, they are unable to compete on equal terms out in society with those more favored in intelligence, and are in a large proportion of cases unable to support themselves.

The periodic drinkers possess a higher grade of intelligence and are far more capable individuals; but, as will be seen later, have certain character anomalies, certain personality maladjustments, that are responsible for their alcoholic outbreaks.

If we now turn to the table of diagnoses it will at once be evident why the difference in these two types is more fundamental than is implied merely in the terms "steady" and "periodic" drinkers.

From this table it will be seen that 72% of the steady drinkers are not self-supporting, while 74% of the periodic drinkers are self-supporting. If we now recall that 74% of the periodic drinkers possessed a mentality above the 12-year limit and 86% of the steady drinkers possessed a mental level below the 12-year limit, the connection between the two will be evident.

It is possibly safe to conclude that in general the chronic alcoholic who has been drinking steadily over a period of years is either a mental defective to begin with, or, from the continued abuse of alcohol, suffers such an insidious impairment of his nervous system and degeneration of his higher mental facilities as to be unable to properly support himself out in society, and is in need of proper institutional care and medical attention. Merely locking them up for short periods, and then turning them out again, would, in the light of the above facts, hardly seem to meet the needs of the situation. Prolonged hospital care and farm-colony treatment are indicated.

With the periodic drinker, on the whole, a different problem is presented. The proportion that are insane, or feeble-minded, or suffering from alcoholic deterioration, is small. In general the periodic drinker is a neurotic individual, possessing the mental characteristics of the psychopath. He is impulsive, unstable, lacking in

TABLE OF DIAGNOSIS OF ONE HUNDRED ALCOHOLICS.

Classification.	Mental Defective.	Psychopath.	Epileptic.	Insane.	Alcoholic Deterioration.	Totals.
50 steady drinkers.....	29 (58%)	—	4 (8%)	5 (10%)	12 (24%)	50 (100%)
50 periodic drinkers.....	8 (16%)	32 (64%)	3 (6%)	2 (4%)	5 (10%)	50 (100%)
Totals	37	32	7	7	17	100

The feeble-minded predominate among the steady drinkers, while the psychopaths predominate among the periodic drinkers. Only 24% of the steady drinkers could attribute their condition purely to alcohol. Only 10% of the periodic drinkers showed no other important causative factor. In 66% of cases did the steady drinker start his career with a mental and nervous handicap (feeble-mindedness and epilepsy). In 86% of cases did the periodic drinker start his career with a mental and nervous handicap (feeble-mindedness, psychopathic constitution, epilepsy).

Finally, the following table of economic efficiency will be seen to correlate well with the foregoing mental findings in these two types of alcoholics:

inhibitions, and highly emotional; often possessing good intelligence, and being quite capable, but apparently unable to make proper use of whatever mental faculties he has, because of his remarkable instability. He works for short periods fairly well, but tries all sorts of occupations, and succeeds in none, because of his lack of continuity of purpose and capacity for the continuous expenditure of effort in any one direction. Out of a clear sky comes an outbreak of alcoholism; in this he appears so irresponsible as to be often thought insane. He drinks for days, or even weeks, and sometimes to great stupor, and then, just as suddenly as it started,

ECONOMIC EFFICIENCY.

Working Capacity.	Steadily Employed.	Irregularly Employed.	Odd Jobs.	Housework at Home.	No Work at All.	Totals.
50 steady drinkers.....	1 (2%)	13 (26%)	16 (32%)	7 (14%)	13 (26%)	50 (100%)
50 periodic drinkers.....	9 (18%)	27 (54%)	2 (4%)	12 (24%)	—	50 (100%)
100 alcoholics.....	10 (10%)	40 (40%)	18 (18%)	19 (19%)	13 (13%)	100 (100%)

the attack is over, his mental condition clears up, and he may not touch alcohol for months. His difficulty lies in his character makeup and temperamental peculiarities. He cannot take things as they are in life; cannot see things in their proper light; is over-sensitive; broods over imaginary wrongs; is unable to shoulder responsibilities, and desires to place a veil between himself and reality. In short, he is constitutionally unequipped to fight the battles of life, and when things become too strenuous for him, he seeks forgetfulness in alcohol.

These individuals are little modified by any form of treatment that does not take into account their mental makeup, or does not tend to build up in them new habits of thought and action. Rather than needing prolonged confinement in hospitals and farm colonies, these individuals have to be incorporated back into society by means of well-directed medical and social service methods of treatment.

SUMMARY.

In a study of 100 alcoholics, who were found to have been repeatedly arrested for drunkenness, and who represented fairly well the typical "old rounders," so-called, who have spent much of their time in and out of penal institutions, and whose conduct seemed little modified by such treatment, it was found:

1. That not more than one-half were capable of supporting themselves out in society;
2. That 56% had the mental level of children below the age of 12 years; and
3. That they were all suffering from conditions in general regarded as medical problems.

For purposes of treatment they, in general, fall into two classes (this must be taken in the very broadest sense);

(a) The *Steady Drinker*, whose mentality is either defective to begin with, or is so deteriorated from the insidious effects of alcohol as to require that he be confined for prolonged hospital care and treatment; and

(b) The *Periodic Drinker*, who, though in many instances he may require short periods of detention, as well as hospital treatment, is in general to be handled on probation and incorporated into society's scheme of living by means of well-directed medical, psychological and social service methods of treatment,—methods that take full account of his peculiar mental makeup, his character defects and temperamental difficulties.

INDUSTRIAL MEDICAL SUPERVISION.

By ARTHUR B. EMMONS, 2d, M.D., BOSTON,

Director for Appointments for Medical Alumni, Harvard Medical School.

INTRODUCTION.

THIS combined article was solicited as an example of successful Industrial Medical Supervision, by Dr. A. B. Emmons 2d, Director of Appointments for the Medical Alumni of the Harvard Medical School. He believes that many more employers of labor could wisely and profitably use, in a similar way, the well-equipped graduates of our large hospitals. He also feels that surgically equipped doctors may see the advantage of such part-time work as a valuable experience, especially in their early years of practice.

I.

THE EMPLOYER'S STATEMENT.

Medical supervision is not a new idea in our factory, but has been in practice for a number of years. We consider it indispensable and a most satisfactory investment, benefiting both employer and employee.

We employ from seven to eleven hundred people, about two-thirds of whom are women. The majority of these are unskilled workers.

We began the work in an effort to protect our customers and ourselves against possible danger resulting from the handling of confectionery by diseased or sick persons, but much more than this has been accomplished. Examination, by physician or nurse, of new employees, and supervision of all, gives us an added opportunity to avoid unhealthy and undesirable help. The physician's factory inspection helps us to develop and maintain higher standards of sanitary conditions and better factory practice. The nurse's work among our employees is, in a way, the human touch of a corporation, which organizations are said to have no souls. The nurse, in addition to constant explanation of personal hygiene, gives occasional helpful talks to groups of employees. Foremen and forewomen are required to report to, or send to, the nurse anyone whom they may suspect of needing attention. A rag on one's finger, or an apparent inability to maintain the ordinary standard of routine would be considered good cause. Employees wishing to leave work because of sickness are referred to the nurse. Some are sent home, some given attention in the rest-room, others admit feigning illness, and are sent back to work. The work is carried on without expense to the employee or to the Relief Association, but service is almost entirely confined to the factory location and hours, without loss of time to the employee.

The work is not only remedial, but educa-

tional, for good habits are formed and proper care of one's self established, insuring a measure of health which makes for regularity in attendance of employees in physical condition favorable to good, rapid, cheerful work.

The results in dollars to our Company are difficult to measure, for most of the return comes indirectly in the form of better health, good spirits, increased interest in work, also in a better class of employees. We also gain the confidence of workmen, salesmen, and even of the consumer, in the healthfulness of our product.

The above facts, together with the happiness afforded, and the good-will fostered among our employees, and the more capable service rendered by them, fully compensate us for the expense involved in securing a physician of experience and marked ability, and a nurse possessing the personal requirements for handling and steadily influencing so large a number.

Our dispensary and rest-room, though perhaps the quietest departments of our factory, exert an influence on the whole, which we should now find it difficult to do without, and we feel that in working for the safety of the public we are benefiting our employees and ourselves.

II.

THE VALUE TO EMPLOYERS AND EMPLOYEES OF TRAINED MEDICAL SUPERVISION IN INDUSTRIAL PLANTS.

BY WILLIAM STEWART WHITEMORE, M.D.,
CAMBRIDGE, MASS.,

Assistant Visiting Surgeon to the Cambridge Hospital.

After an experience of over five years as surgeon to a large confectionery factory, I am so impressed with the value to employers and employees of trained medical supervision that I wish to urge the establishment of such supervision in all industrial plants employing any considerable number of persons.

The company which I serve employs over eight hundred factory hands, in addition to an ample office force. Although the plan which I am about to describe is particularly applicable to establishments which manufacture food products, such as candy, bread, and biscuits, it may readily be adapted to the needs of any industry.

The problems confronting me when I undertook this work were:

1. To make sure that every employee, who came in contact with the candy or any of its ingredients, was free from communicable disease.

2. To make sure that every new employee that entered the factory should be similarly free from communicable disease.

3. To keep the employees in good health.

In order to find out whether the eight hundred odd factory workers were in good health, I had to go through the factory, systematically examining each employee. The method pur-

sued was as follows: From the superintendent's office I secured cards bearing the name, number, and department, or room number of each employee. Below there was space where I could record whether I found the person in good health or not. (See Fig. 1.) Each card was

FIG. 1.

Dept.	Name.	Number.
26	John Doe.	75
	Remarks.	

Examination satisfactory.

filled out by me after my examination and put on file in my office card catalog. I examined all the employees in one department before going on to the next. When I visited a department I gave these cards to the foreman in charge, who then distributed them to the employees, each receiving the card with his or her name upon it. The workers then formed in line and filed out to be inspected. I took a position in an adjoining ante-room or hall, where the light was good, and went over each employee carefully. If any of the factory hands were absent, the foreman retained their cards, and they were sent to my office for examination the moment they returned to work.

Whenever I found a curable disease, the employee was temporarily excluded from work, but came to my office in the factory for treatment. When well, he returned to his work. Anyone suffering from an incurable malady was discharged, but was placed under the care of the proper hospital for the treatment of his disease.

In order that no new employee should enter the factory with a communicable disease, the ruling went forth that every person who was engaged to work must present to his foreman a certificate from me saying that I had examined him, and had found him in good bodily health. Repeatedly I have excluded from the factory persons suffering from contagious skin diseases which had escaped the eye of the superintendent who had engaged them.

The remaining problem was to keep the employees in good health. The first move in this direction was to gain the confidence of the men and women employed in the factory, and to encourage them to come to me to report whenever they were ill. The company fitted up a very good dispensary, centrally located in one of the factory buildings and easily accessible to the employees. I began by having office hours for an hour and a half twice a week, but the service became so popular that now I have office hours three times a week. Next, a graduate nurse was engaged, who is on duty in the dispensary all the time. She dresses all kinds of minor injuries and sends the more serious ones to the hospitals of Boston, in case I am not present to care for them myself. The company supplies the employees with medicines free of charge. I have on hand a good stock of tablets, ointments, etc., and very rarely have to give a prescription to a patient.

All the foremen and forewomen have been instructed to report to me any worker who has anything the matter with him, whether it be a blister or a cough, a rash or a headache. Minor injuries, such as scratches or burns, which formerly went untreated and were frequent sources of blood-poisoning, are now reported at once, and are treated so carefully that in five years I have been able to reduce the number of cases of blood-poisoning to a negligible minimum. However, I do not entrust the health of the employees to the vigilance of the foremen and forewomen entirely, but I make it part of my regular work to inspect each department, to see for myself how everyone is faring. On such occasions I frequently "spot" some slight injury or skin trouble, which has been overlooked or regarded as too trivial to report.

I must not fail to mention certain general rules which are of importance. Whenever a hand is absent from work he must receive upon his return a certificate from me saying that he is in good health, before he is allowed to resume his occupation. Each employee must be successfully vaccinated before he can enter the employ of the company. I well remember how, within the past three years, an entire factory in another industry in a neighboring city was obliged to suspend work because of an outbreak of smallpox among the workers. This is a disease which can be absolutely prevented by the simple procedure of vaccination, and in no other way.

Any person who is found to be suffering from venereal disease is discharged absolutely and is never re-employed. This is done as much for the protection of the other employees as for the prevention of the remote possibility of transmitting the disease to the consumer through the candy.

All employees addicted to the habitual use of alcohol in excess are discharged. To keep such persons near high-power machinery is to court disaster, not only to them but to other workers.

All employees afflicted with any disease, general or local, which might be transmitted to others, are excluded from handling candy until they are well. All cases of tuberculosis of the lungs are discharged at once and are never re-employed. Such persons should not, for their own sakes, be shut up in a factory, but should have employment out of doors.

Careful records are kept of all patients treated in the dispensary. Employees are encouraged to confide in the factory surgeon by the fact that all the records are guarded just as secretly by the physician as are the records of his private patients. The records are kept under lock and key, and no one except the physician and nurse has access to them. The president regards them as the physician's private property, and has repeatedly stated that he does not wish to know, or have anyone except the physician and nurse know, what these records contain.

A few words now as to the type of man to select for a factory surgeon. He should be a graduate of a first-class medical school, which requires at least two years of college work before the study of medicine is permitted. He should have had at least one year's internship in a large hospital, where there is plenty of experience to be gained in treating accident cases. That he should be a *surgeon* goes without saying, because most of the accidents in a factory will require good surgical judgment in their treatment.

With a trained nurse in attendance at the dispensary all the time I find that I need to spend only one and one-half hours at the factory three times a week. In the case of factories where the work is especially hazardous, the surgeon might be obliged to make more frequent visits.

I need not dilate upon the immense advantage to the employer in such a scheme of medical supervision. Whereas formerly this company which I serve was hampered at times by having valuable men laid off with blood-poisoning and other preventable ills, it is now remarkably free from such troubles. When the company engages new employees it knows that they are fit to do the work, and it has the great economic advantage of knowing that the products it sells are pure, and no one need fear infection with disease from eating the candy it manufactures.

The advantages to the employees have already been enumerated for the most part. If an employee strains his back lifting heavy barrels, the physician confers with the superintendent, and arranges that he have some other form of work which does not require muscular exertion, until he is well. If a girl develops flat-foot, the physician secures for her a change of work, so that she may not be required to stand up, but may work sitting down.

Society is coming more and more to recognize that sickness, disease, and death are forms of economic waste, just as truly as are fires and floods. The twentieth century bids fair to be an era marked by great advances in methods of preventing disease, as well as in measures designed to make conflagrations and floods well-nigh impossible. The fire-extinguisher is found on every hand in all great manufacturing establishments, because experience has taught that just the right thing done at the moment the blaze begins will save thousands of dollars, and often human lives as well.

Trained medical supervision is comparable to the fire-extinguisher. It can prevent loss to the employer and employees alike from sickness and death. Money is being constantly expended to keep machinery in good condition, whether the machinery is used in making bread or in making shoes. Why not give as much attention to the men and women who tend the machines? If they are not well they are not at their highest point of efficiency, and the business suffers just as surely as if the machinery were poor.

III.

STATEMENT OF PRESIDENT OF MUTUAL BENEFIT ASSOCIATION OF EMPLOYEES.

The members of the Mutual Benefit Association of the Employees favor the present factory medical supervision, as it benefits them in many ways, saving them time and suffering, and making them more efficient in their work. The services and advice of a nurse are greatly appreciated, and her calling at the homes in time of illness seems to be welcomed by all of them.

IV.

THE NURSE'S STATEMENT.

I am located as Resident Nurse in a large candy factory, employing between eight hundred and one thousand persons, and am on duty during working hours. The office, or dispensary, provided for our medical department is equipped with every convenience for first-aid work, or any emergency that may occur. A sick room, cool and comfortable, with couches and blankets, has been added since I came, and there I take my patients who feel faint, overheated, or ill in any way, and fix them up so that they can return to their work. They rarely want to go home if I am able to stop their "aches and pains," and usually return to their work after a little while, grateful and refreshed. Where it used to be a common occurrence for many girls to go home for any minor ailment, since the sick room was installed it is a rare thing.

Every employee, wishing to go home on account of illness, reports at our office, so that I am able to help a great deal, and to send those needing immediate medical attention to a hospital or to their family physician. They come to the office with all kinds of ailments and, if surgical operations are necessary, we have them admitted to a hospital. My work includes minor dressings of all kinds, examination of new employees, when the doctor is not present, visits to the homes of sick employees, guarding against contagious and skin diseases, particularly tuberculosis, bringing to the doctor's attention cases for him to examine and treat, lectures and talks to the girls on prevention of disease, personal cleanliness, wearing uniform aprons and caps, care and treatment of eyes and teeth.

I do not make as many visits to the employees' homes as do many factory nurses, but when I do go I feel amply repaid in the results accomplished. There are a great many ways a nurse can be of help and service. Sometimes a girl comes to the office in great distress,—some member of her family is very sick, whom she wants to have sent to a hospital, or, what can she do for the sick baby? Or father and brother are out of work; cannot the nurse help them?

To cite a few cases:

CASE OF M. C. The father, 53 years old, was out of work, laid off indefinitely. The daughter, 13 years old, who helped support the family and worked here, had been sick three weeks at home. The mother, about 40 years old, in the second stage of pulmonary tuberculosis, was eight months pregnant. There was a girl of 11 years, and one 2 years old. With the assistance of the Associated Charities, we had the mother treated by the City Physician. The baby died shortly after birth, and, as soon as able, the mother was put in the tuberculosis ward of the hospital near by. The father was put back to work, the daughter was examined and treated by the doctor and returned to her work here, and the two small children were put in the Day Nursery until some better plan could be arranged.

CASE OF M. B. This woman worked for us several years. Her husband died, leaving her with three small children. She was an Italian and spoke very little English. We treated her for chronic appendicitis for several months, and urged her to be operated upon, and were finally successful in gaining her consent. While she was at the hospital, I investigated her conditions at home, and finding her most worthy for a mother's pension, I recommended it to the Overseers of the Poor, who acted upon it and granted it. She is now at home caring for her children, not over strong, but happy in her little home, and I often go out of my way when I am in the North End to call upon her.

CASE OF M. U. One morning one of our Italians came into the office, and in broken English, told me his little baby at home was very sick. The doctor attending it could not seem to help it. Wouldn't I have it sent to the hospital? It would surely die if I didn't. I had a district nurse call at the home and on the doctor attending it, with the result that the baby was sent to the hospital, where it remained for some time, and was finally sent home well.

Occasionally we find incipient cases of tuberculosis, and we do everything we can to arrange for them to go to some one of the state sanatoria. A number of cases have been entirely cured; others have remained in the mountains, doing outside work.

A nurse should strive at all times to keep the employees well, happy and content, as far as she is able. She should study them at their work, and encourage them to go to her with all their aches and pains and troubles. She should counsel and advise them to the best of her ability, and impress upon them that she is their friend, and that it is a pleasure for her to help them in any way possible. If she notices that this or that one is working with effort, that he looks ill, she should encourage him to see the doctor and get treatment. In doing this she prevents more serious illness and often loss of time.

In this way we have eliminated a great deal of sickness and physical inefficiency, and in the three years I have been here I can see a great

change. Many ailments then due to ignorance, are now avoided. The girls are learning to take care of their health. My talks to them on these matters have been remembered and results obtained.

I have received splendid coöperation and help from our Hospitals, the Associated Charities, the Dental Schools and the Social Service workers of Boston, and I feel that our medical work not only benefits and educates our employees here, but the knowledge gained is passed on to benefit and help the sick members of the family at home.

V.

SUMMARY FOR THE YEAR 1914.

Office calls during year.....	7177
Attending Dr. Whittemore's Clinics.....	724
Minor operations by Dr. Whittemore.....	18
New employees inspected by Dr. Whittemore.....	7
New employees inspected by nurse.....	244
Excluded from factory as undesirable.....	38
Excluded temporarily from handling candy.....	41
Cases under observation.....	80
Surgical dressings during year by nurse.....	3376
Treated at Massachusetts General Hospital.....	29
" " City Hospital.....	14
" " Relief Station.....	8
" " Mass. Char. Eye and Ear Infirmary.....	23
" " Boston Dispensary.....	3
" " Harvard Dental School.....	38

MEDICAL CASES.

Acne.....	19
Anemia.....	14
Arteriosclerosis.....	1
Atrophic rhinitis.....	1
Aortic regurgitation.....	1
Aortic and mitral disease.....	1
Acute dilatation of heart, fatal.....	1
Chapped hands.....	24
Conjunctivitis.....	10
Constipation.....	129
Colds and influenza.....	350
Chronic nephritis.....	1
Chickenpox.....	1
Debility.....	13
Diarrhoea.....	44
Erythema multiforme.....	3
Ear trouble.....	7
Eye trouble.....	5
Eczema.....	12
Epistaxis.....	5
Gonorrheal epididymitis.....	1
Hysteria.....	3
Herpes.....	6
Heat exhaustion.....	7
Hemorrhage from lungs, fatal.....	1
Headache.....	463
Insect bite.....	10
Indigestion, gastric.....	96
Indigestion, intestinal.....	40
Impetigo contagiosa.....	3
Impacted concealed molars.....	1
Menses.....	1
Rheumatism,—lumbago.....	58
Nausea and vomiting.....	56
Pregnancy.....	10
Phlebitis.....	3
Psoriasis.....	2
Pediculosis.....	3
Papilloma of uvula.....	1
Sunburn.....	6
Sciatika.....	1

Scabies.....	2
Syncope.....	21
Stomatitis.....	14
Shingles, Herpes Zoster.....	1
Tinea.....	2
T. B. eyes.....	1
Tuberculosis, pulmonary.....	5
Tonsillitis.....	137
Toothache.....	91
Tenosynovitis of wrist.....	5
Varicose veins.....	2
Vertigo.....	10
Wrist strain.....	34

SURGICAL CASES.

Abrasions.....	128
Contusions.....	34
Contusions and dislocations.....	1
Fractures.....	2
Incised wounds.....	121
Lacerated wounds.....	19
Punctured wounds.....	38
Sprains.....	2
Strains.....	9
Abcesses.....	5
Appendicitis, acute, op.....	6
Appendicitis, chronic.....	3
Burns.....	139
Carbuncles.....	2
Furuncles.....	72
Frost bite.....	10
Flat foot.....	4
Foreign body in eye, removed.....	136
Gastric ulcer, operated.....	1
Hernia, operated.....	2
Hernia, not operated.....	1
Infected fingers.....	126
Infected toes.....	3
Infected hands.....	9
Infected heels.....	8
Otitis media.....	2
Sarcoma, op.....	1
Stones removed.....	138
Stone in ureter, op.....	1
Sty.....	7
Submaxillary adenitis, op.....	1
Tonsillectomy.....	1

SUMMARY.

To sum up the material presented here, we have, briefly:

A food factory employing eight hundred to a thousand men and women, largely unskilled labor, retaining the services of a supervising surgeon and full-time trained nurse. This inspection and supervision accomplishes the following advantages:

1. To the employer, increased good-will, steadier, quicker and more contented employees. Greater cleanliness of shop and product. Sufficiently improved conditions to make the outlay entirely justified.

2. To the doctor and nurse, opportunity to be of distinct service to their patients, and to assure cleanliness and freedom from disease in the food manufactured,—no small service to the employees, the directors and the consuming public.

When the public is aware of these safeguards can other employers afford to be without such safety and advantages?

THE TRUTH ABOUT SMALLPOX AND VACCINATION.

BY GEORGE W. GAY, M.D., BOSTON.

PREVIOUS to the discovery of vaccination, smallpox was one of the most common, most contagious and most fatal of diseases afflicting the human race. It caused one-tenth of the deaths in ordinary times and, during the not infrequent epidemics, it was responsible for one-half of the fatalities. It destroyed, maimed or disfigured one-fourth of mankind. In some of the epidemics half of the children in the community under five years of age perished. Many lost their sight or hearing and few faces escaped traces of its ravages. In the graphic language of a celebrated English historian, "The disease was always present, filling the churchyard with corpses, tormenting with constant fears all whom it had not yet stricken, leaving on those whose lives it had spared the hideous traces of its power, turning the babe into a changeling at which its mother shuddered, and making the eyes and cheeks of the betrothed maiden objects of horror to her lover."

No description can portray the terrors of an epidemic of smallpox in the pre-vaccination days. The people were helpless and hopeless in its presence. It spared neither high nor low, rich nor poor, strong nor weak, hygienic or the reverse, all were alike subject to its ravages. Recurring epidemics prevailed until practically all, not protected by a previous attack, had become infected. In other words, the disease, like a prairie fire, burned itself out for lack of fresh material.

Such, in brief, were the conditions up to the latter part of the eighteenth century. At this time the chance remark of a servant who consulted a young English physician, started an investigation that robbed the scourge of its terrors. "I can't have smallpox, because I've had cow-pox," said the patient above alluded to. After nearly a quarter of a century's observation and study, Dr. Edward Jenner became so firmly convinced of the truth of the milk-maid's assertion that he deliberately vaccinated James Phipps, a lad eight years of age, with virus taken from the hand of Sarah Nelmes, a milk-maid who had been accidentally inoculated with cow-pox from one of her master's cows. Jimmy went through his vaccination normally, as we see it today all over the civilized world. Two months later he was inoculated with virus taken from a person ill with smallpox, as a test of his protection. He did not take smallpox. This experiment was repeated upon many persons before it was given to the world, in 1798, by its distinguished discoverer.

Like some other great discoveries, this one, through ignorance, prejudice, etc., met with opposition, but its intrinsic merits finally overcame the opposition to a great extent and the

practice became established as one of the greatest life-saving measures known to the profession. The experience of more than a century has proven conclusively that efficient vaccination prevents smallpox. The protection is in direct ratio to the thoroughness of the procedure. Partial protection so modifies the virulence of the disease that it is comparatively free from danger. Modified smallpox, varioloid, as it is called, is contagious and gives rise to smallpox in the unvaccinated, thereby proving to be a serious menace to the community, just as a mild case of scarlet fever may produce one of great virulence, or as a smouldering rag may cause a conflagration. It is not a fatal affection, however, and, aside from its menace to others, is of no serious importance.

The evidence that vaccination practically prevents smallpox is overwhelming. Those countries that are most efficiently vaccinated suffer the least from the scourge. For years Germany has led the world in that respect. Efficient vaccination in infancy, childhood and young adult life has so thoroughly protected her people that she has no pest houses for the care of smallpox, as have other nations. She has been free from this disease for more than forty years, while the adjacent nations are never free from it.

Systematic vaccination by the surgeons of the United States Army in six provinces in the Philippines, having an approximate population of one million, reduced the annual smallpox mortality from 6,000 to nothing. During the succeeding five years there was not a death from this disease in this region of a vaccinated person. Eight hundred thousand natives of Porto Rico were vaccinated by the medical officers of the United States Army in 1898, with the result that smallpox was under control for the first time in the history of the island.

In 1885 smallpox broke out in Montreal and swept over the city like wildfire. The upper classes protected themselves by vaccination and escaped the disease. The ignorant classes refused vaccination and more than 3,000 perished from smallpox. The scourge finally burned itself out for lack of unprotected material.

From 1840 to 1874 the annual death rate from smallpox in Boston was about 100. In 1872-3 a severe epidemic sprang up in that city. Nearly 4,000 had the disease and more than a thousand died from it. The epidemic was finally controlled by general vaccination and isolation. An efficient board of health was created at that time and vaccination was made a condition for entrance to the public schools, thereby affording protection to the children of the careless, thoughtless and ignorant parents. Since that time this disease has been a negligible factor in the daily life of that city. Aside from a little flurry in 1902-3, the annual death rate from this disease has averaged less than two, and many years there has been none, a condition that never

obtained previous to the enactment of the mild compulsory vaccination law. The present generation in that city knows nothing of this disease from experience, many physicians even never having seen a case of it.

The experience of the city of Niagara Falls a few years ago is interesting. The pernicious influence of one or more opponents of vaccination had caused a large proportion of the 35,000 inhabitants to neglect vaccination. Smallpox broke out and spread over the city, until the state board of health was called in to check it. To avoid quarantine and to prevent the destruction of the tourist business, the local board of health finally got busy and over 20,000 of the inhabitants were vaccinated within a short time. As a result of this energetic and intelligent action, the epidemic was soon under control. The above examples of the benefits to be derived from vaccination are of official record and cannot be reasonably questioned. The other side of the subject may now receive our attention.

No reasonable advocate of vaccination claims that the procedure is entirely free from complications. Any accident or operation that breaks the skin, however slightly, may be followed by an infection, blood poisoning, as it is called in common parlance. Harmful germs, bacteria, may find entrance to the system through the most trivial wound unless prevented by well-known measures. The effects of infection depend upon the character of the noxious material, the condition of the individual, the treatment, etc. They vary from a discomfort, purely local and so slight as to be negligible, to a severe systemic disturbance with occasional serious consequences. Within the past ten years the writer has seen one death and two amputations of the arm following the prick of a needle, or the scratch of a pin. In half a century's experiences he has never seen nor known of such misfortunes following vaccination. Sore arms are not uncommon, but the trouble is purely local and results in no permanent injury whatever.

Clean surgery is safe; none other is. Sterile wounds, *i. e.*, those free from noxious germs, however large and wherever located, usually heal safely and speedily. Vaccination is a surgical operation and hence should be done in accordance with the well-known rules of antiseptic surgery. And what is of even more importance, the after care should receive most careful attention. A clean arm, a clean needle, clean hands, a pure virus, intelligent after care, these are the essentials to success. Under these conditions the operation is one of the safest known to surgery. The complications are negligible.

Not infrequently, however, the operation is done without the above precautions and by those who know nothing of them. They are totally unfit to do even so slight an operation. Most

of the complications are due to neglect in the after care. Sore arms following vaccination are usually due to soiled clothing, and rubbing and scratching with dirty hands or fingernails. Any wound, however trivial, may be infected in this manner. The wonder is that more trouble does not occur under these conditions.

In these days there is no excuse for using impure vaccine virus. It is raised in young calves that have been carefully tested for those diseases to which they are liable. The process of vaccinating the animals is carried out with all possible antiseptic precautions. After the virus is collected, they are immediately killed and examined for any diseased condition. If such is found, the virus is destroyed. If the animals are found to be healthy, the virus is placed in cold storage for several weeks, during which time it is repeatedly examined and also tested upon guinea pigs to ascertain its purity and efficiency. If it comes up to the desired standard, it is then sealed in glass tubes and is ready for distribution. Heat, even of the vest pocket, ruins the virus. Some of the states raise virus and furnish it free of charge to citizens. During the past ten years Massachusetts has raised and distributed free of charge 814,412 doses of vaccine virus and thus far has received no complaint as to its purity or efficiency.

For how long a period does a single successful vaccination protect an individual? It varies greatly in different persons. Many physicians and nurses who attend smallpox patients are protected by one "take." They usually repeat the operation occasionally as a precaution, but one "take," followed at once by another trial as a test, will protect a large number permanently. Yet, as a trial is the only sure test, it is well for all who have not been vaccinated within five years to repeat the operation on being exposed to smallpox. This is the most certain method of protection. As a rule, those persons who have had smallpox, or varioloid, do not need vaccination under any circumstances. There are very few deaths from smallpox among vaccinated persons, even when many years have elapsed since the operation. Complete protection however, does wear out in a certain proportion of cases, hence it is safer to repeat the operation occasionally until it is demonstrated that the susceptibility has lapsed. The German method is reasonably efficient.

Primary vaccination should be done during the first year of life as "cradle vaccination" causes comparatively little disturbance when properly performed. In adults the first vaccination with animal virus may cause considerable disturbance, but no permanent injury.

That diseases are not transmitted by vaccination in these days is evident from the fact that none exist in the animals from which the virus is taken. Furthermore, the affections alleged to be carried in that way, tuberculosis, tetanus, the social disease, etc., are as common in the un-

vaccinated as in the vaccinated. Even in the old days previous to the almost universal use of animal vaccine, when vaccination took place from arm to arm, it was the rarest of events for any affection to be conveyed in this way. Local infection in the shape of sore arms was common enough, as now, but systemic infection was almost unheard of. Careful investigation of the alleged serious results of vaccination usually showed that the trouble was due, not to the virus, but to the lack of care and skill in its performance and subsequent treatment.

It has been claimed that hygiene, isolation and quarantine would control smallpox without resorting to vaccination. Experience proves conclusively that this disease is not controllable in this way. Without vaccination it is as prevalent among the hygienic as among the other sort, in fact, in the Niagara Falls epidemic, it was even more prevalent among the upper classes.

Isolation and quarantine are practicable only during the actual presence of the disease. No one would think of resorting to these measures under other conditions. Furthermore, these measures would be of no use to those traveling in regions infested with smallpox. Some years ago an excursion party of Americans was broken up on arriving in Italy by this disease. The steamer was cleared and several hundred were turned adrift among strangers, some being without sufficient funds, and all found themselves in distressing conditions. Several persons had the disease. Efficient vaccination would have prevented the catastrophe.

It is natural that individuals who may have seen or experienced any of the disagreeable complications occasionally attending this operation should be prejudiced against it. This is human nature. A broader view of the subject is essential for deciding the real benefit to be derived from the procedure. The official and most reliable evidence the world over is overwhelmingly in its favor, so much so, in fact, that individual incidents should not be permitted to obscure the main facts in the case. No one would think of discarding steam or electricity from our modern life by reason of the occasional accidents resulting from their use. No more should this safeguard against a loathsome disease be given up by reason of an occasional mishap, especially as even that is avoidable.

Vaccination was never so safe nor so reliable as it is today. It has saved millions of lives. It has prevented an amount of suffering, mental and physical, that surpasses comprehension. The accidents attending the operation are usually avoidable and hence are a negligible factor. The advantages far outweigh the disadvantages. The intelligent portion of mankind the world over accepts the procedure. The risks are slight, so slight that they should not have any weight in deciding the question. They are of little consequence. The experience of more than a century

amply justifies confidence in the operation despite the hue and cry of a few woefully mistaken agitators who oppose it. If any event in human affairs has been demonstrated beyond a reasonable doubt, it is the great benefit to be derived from timely, efficient, skillful vaccination against smallpox.

Medical Progress.

RECENT PROGRESS IN PSYCHIATRY.

By HENRY R. STEDMAN, M.D., BROOKLINE, MASS.

(Concluded from page 467.)

FATTY DEGENERATION OF THE CEREBRAL CORTEX IN THE PSYCHOSES.

Cotton* finds that in all degenerative alterations in the cerebral cortex, the mass of the lipid materials in the ganglion cells, in comparison with that in healthy individuals of equal age, is found to be considerably augmented. Two types in general may be distinguished; (a) An augmentation of the lipid materials in the ganglion cells, in places where normally a small amount of fat is found. (b) An augmentation of the lipid materials over the entire cell. The first type is also characteristic of senile dementia. The second type occurs in acute infectious psychoses, general paralysis, and well-advanced epilepsy. In young chronic cases of dementia precox, far-reaching fatty degeneration of the ganglion cells, especially in the second and third cortical strata, occurs comparable to the advanced lipid degeneration of the ganglion cells in senile dementia. The so-called central neuritis represents a peculiar disease process, according to the appearance of the fatty degeneration, since this fatty degeneration reaches a very advanced degree, and also in so far as it deviates from other disease processes in that here there comes out very distinctly in the picture an inclination of the fatty granules to flow together. Amaurotic idiocy also represents a particular disease process, in respect to the lipid degeneration, since here, in addition to otherwise distributed scarlet stain lipid materials, still other specific lipid materials make their appearance.

NATURE AND TREATMENT OF GENERAL PARALYSIS.

Marinesco⁹ holds that no hard and fast line can be drawn between general paralysis and cerebral syphilis, histologically speaking, and that cases where lesions of syphilis and of parasyphilis (so-called) co-exist are frequent. He quotes two cases of his own showing this. Again, in experimental syphilis in the rabbit, similar results have been obtained. Instances of conjugal

syphilis not infrequently point in the same direction. Marinesco does not believe in a special variety of the syphilitic virus which is neuro-toxic, but holds that soon after syphilitic infection, both the blood and the cerebro-spinal fluid are invaded by the spirochete. As neither of these is in reality a suitable medium for the cultivation of the organism, the latter has to fight for existence, especially if energetic treatment is undertaken. Some may resist and gradually develop, according to the site which they happen to occupy, cerebral or spinal syphilis, or, later, tabes or general paralysis. He thinks that the successful spirochete acquires secondary properties after it invades the nervous system. These properties, however, are neither permanent nor unalterable. No one has shown that the virus obtained from the brain of general paralytics, injected into the rabbit, produces lesions which are exclusively limited to the central nervous system.

TREATMENT OF PARESIS BY ENDO-LUMBAR INJECTION OF NEOSALVARSAN.

Contrary to Cotton's findings in this direction¹⁰ are the results obtained by Read.¹¹ Twenty cases of well-advanced paresis in male subjects were treated with 123 endo-lumbar injections of neosalvarsan, in doses ranging from .003 to .006 and .008 gram, diluted in at least 10 cc. of the patient's own fluid and given at intervals of two weeks. A number of patients received as high as ten doses. During the treatment, three patients died, but two of these were in the final stages of the disease when treatment was instituted, and death cannot be fairly attributed to interference. One case, already slightly spastic when received, became quite intensely spastic and died after about three months' treatment. Three patients suffered incontinence of urine, apparently as a result of dosages of .006 gram. A few complained of weakness, headache and leg pains from time to time, following treatment. A few had a slight rise of temperature for a short time following some treatments. One case of tabo-paresis developed a Charcot's joint during treatment. One suffered convulsions immediately after treatment, but had had other convulsions not connected with treatment. The Wassermann upon the blood serum in nine cases remained strongly positive. In one case it became negative and in another case it remained negative. The others were not tested. One negative and one faintly positive Wassermann in the spinal fluid became strongly positive.

A few favorable results were noted. In one case a very good remission began after a few treatments, but the spinal fluid findings are still positive. Others are markedly improved, but are still very evidently paretics. A number showed improved physical health. In three cases the Wassermann upon the spinal fluid became weaker.

Upon the basis of the above results, it seems fair to conclude that endo-lumbar treatment of paresis with neosalvarsan in small dosages (.003) is without effect, and that when the dose is increased, the results are extremely apt to be injurious. The use of neosalvarsan in this manner is to be discouraged.

REFERENCES.

- ¹ Am. Jour. of Insanity, Vol. lxxix, No. 5.
- ² Archiv für Psychiatrie und Nervenkrankheiten, Band 52, Heft 2.
- ³ Gazzetta degli Ospedali e delle Cliniche, Milan, Apr. 11, xxxvi, No. 29.
- ⁴ Jour. Nerv. and Mental Dis., September, 1915, xlii.
- ⁵ Russkiy Vrach, Petrograd, xiv, No. 36.
- ⁶ Nederlandsch Tijdschrift voor Geneeskunde, Amsterdam, May 1, No. 19.
- ⁷ Proc. Roy. Soc. Med., June, 1915, viii, (Sect. of Psychiat.), p. 21.
- ⁸ Jour. Exp. Med., October, 1915, xxii.
- ⁹ Neurol. Centralbl., 1914, xxxiii, Dec. 1, S. 1234.
- ¹⁰ BOSTON MEDICAL AND SURGICAL JOURNAL, Vol. cxxiv, No. 8, Feb. 24, 1916, p. 2.
- ¹¹ Proceedings, Chicago Neurological Soc., Jour. Nerv. and Ment. Dis., November, Vol. 42, No. 11.

Reports of Societies.

NEW ENGLAND PEDIATRIC SOCIETY.

MEETING HELD AT THE BOSTON MEDICAL LIBRARY,
DECEMBER 10, 1915.

The President, Dr. E. M. BUCKINGHAM of Boston, in the Chair.

The following papers were read:

1. Simple Incision in the Treatment of Pyloric Stenosis. J. S. STONE, M. D., BOSTON.
2. Spasmodic—Report of Ten Cases—Etiology and Treatment. F. P. WEBSTER, M.D., PORTLAND, MAINE.
3. Fermentative Diarrhea in Infants.* L. W. HILL, M.D., BOSTON.

The following officers were elected for the ensuing year: President, Dr. A. C. Eastman of Springfield; vice president, Dr. Charles Hunter Dunn of Boston; secretary and treasurer, Dr. Richard M. Smith of Boston; member of Council for three years, Dr. John Lovett Morse.

DISCUSSION.

SIMPLE INCISION IN THE TREATMENT OF PYLORIC STENOSIS.

DR. VINCENT: Dr. Stone has referred to the cases which I have done at the Infants' Hospital. In the two years that have passed since the new Infants' Hospital was opened, we have had 12 cases of pyloric obstruction which came to operation. During that time, I have also operated upon three additional cases, one outside and two at the Massachusetts General Hospital. The operation in all these 15 cases was a posterior gastroenterostomy. Eleven of these cases had definite hypertrophic stenosis. They all presented the typical cartilage-like tumor at the pylorus which was felt under ether or during the course of the routine abdominal examination. The other four were cases of partial

* See JOURNAL, page 487.

stenosis or what Dr. Stone referred to as cases of pyloric spasm. The 11 cases of hypertrophic stenosis made a good operation recovery. One died at the Children's Hospital of some form of acute intestinal obstruction a few months after the initial operation. As to the present condition of the two infants done at the Massachusetts General Hospital, I am unable to report at this time. The other eight cases have reported within the last two months, two by telephone and six in person in response to a request which we sent out in October. All of them are perfectly well. The condition of the six which reported for examination at the hospital was most encouraging. They were not only healthy, but robust children. This agrees with the experience of other surgeons and demonstrates that posterior gastroenterostomy need not have a high operative mortality and that the functional result is good. I grant that it is a harder operation than the splitting operation which Dr. Stone has described. My one operation of this kind was done some three years ago at the old Infants' Hospital on a very sick infant with an easily palpable pyloric tumor. In this instance, I feared that the child would not stand the longer operation as I split the pyloric tumor. On the second day there was separation of the abdominal incision which required secondary suture and the child died. The specimen showed a pylorus which easily admitted a lead pencil. The unfortunate complication in this case prevented one from drawing any conclusions except that the operation was quickly and easily performed and seemed to relieve the obstruction. Our experience with posterior gastroenterostomy for partial stenosis or spasm has not been so encouraging as with the cases of hypertrophic stenosis. Two of the four cases of partial stenosis came under observation a year ago and were finally operated upon because they were failing in spite of every kind of feeding. One died the day of operation and the other a week or two after the operation. The other two cases are in the hospital at the present time having been operated upon within the week. One was a difficult feeding case of nine months with a dilated stomach and a palpable pylorus, but no tumor. I did a posterior gastroenterostomy and the child will probably make an operative recovery, although the vomiting continues and the convalescence is stormy. The other case is an infant of a few weeks with a pylorus palpable at operation but no tumor or dilatation of the stomach. Vomiting also persists in this case and recovery seems doubtful. I feel that posterior gastroenterostomy is not an altogether satisfactory operation in these cases of partial stenosis. Certainly it does not give the good results which are obtained in the hypertrophic cases. For this reason I am disappointed to hear Dr. Stone say that, in his experience, the splitting operation is also unsatisfactory in these cases. As these cases of partial stenosis or spasm are suitable for surgical treatment it seems reasonable to expect that the problem might be solved by some such plastic operation on the pylorus.

DR. DUNN: I should like to explain the classification of these cases of pyloric stenosis which we are now using at the Infants' Hospital, which I think is a little different from Dr. Stone's. We are calling spasm only those cases which have no abnormal anatomical condition at all at the pylorus, and which show delayed emptying time of the stomach and visible peristalsis. We are calling

everything else hypertrophic stenosis of the pylorus, subdividing into complete and partial, and the difficulty comes in distinguishing always between the spasm cases and those which have only a partial stenosis, because both apparently have delayed emptying time. In looking over all the cases in which there was a suspicion of pyloric stenosis at all, we find that all the cases which were diagnosed as complete stenosis were operated on soon and got well; all the cases which we considered spasm also got well, and all the cases which we considered partial stenosis died, probably as the result of the difficulty in making the diagnosis.

DR. TALBOT: My impression of the emptying time of the stomach of these two conditions is confined to a few instances in which we have had x-rays of bismuth meals. In nearly complete stenosis of the pylorus, no bismuth goes through the pylorus. In what we considered spasm of the pylorus, almost immediately after a test meal of bismuth, it is seen squirting through the pylorus, and I assume that the delayed emptying time refers to the emptying of the entire contents of the stomach as a whole.

DR. MORSE: I have been very much interested in watching the cases of which Dr. Stone has spoken, and very favorably impressed by the operation. There is, of course, no question that babies do well after a good posterior gastroenterostomy. There seems to be no question, too, that, at any rate for a year, babies do just as well after this splitting of the pylorus as they do after the other operation. That being the case, it seems to me that an operation which takes less than ten minutes, with very little shock, is preferable to one which takes 35, 40 or 45 minutes and is accompanied by a considerable amount of shock. For this reason I shall certainly, for the present, recommend splitting of the pylorus rather than posterior gastroenterostomy. I am positive that one of these babies would never have come off the table alive from posterior gastroenterostomy operation. There is one thing to be remembered in the feeding of these cases, and that is, that the same rule must hold here as after posterior gastroenterostomy. If the intestine has been out of commission so long that it is all shrunken down and has not been in the habit of taking care of food, we must begin to feed very carefully, because the intestine is unable to take care of any considerable amount of food. If, however, the intestines are of good size and not shrunken, we can give considerable amounts of food from the beginning. It is important, therefore, for the operator to take note of the condition of the intestines at the time of the operation.

DR. LADD: In regard to the case operated on by Dr. Stone in July, which was under my care subsequently, the immediate effects of the operation as regards vomiting was not particularly apparent. The baby vomited a good deal, and for some weeks the feeding problem was a difficult one, but I feel that that operation did that child considerable good. The subsequent history has been very favorable, and now the baby has stopped vomiting entirely for several months, has gained a good deal in weight, and today weighs as much as the normal child of its age. Previous to the operation no progress whatever was made in its nutrition, although it was a breast-fed case.

DR. STONE, in closing: What I have called the spasm cases were those in which bismuth passed

through the pylorus as shown by the x-ray. The emptying of the stomach may have been retarded, but a considerable amount went through. Operation showed some slight thickening of the pylorus, but not the true pyloric tumor. The stormy convalescence in these cases of which I spoke, and which Dr. Vincent mentioned afterward, make me feel very strongly that the feeding plays a very important part. I would differ from Dr. Ladd in giving credit to the surgeon rather than in taking credit to himself. I think the feeding afterwards has done the most good, even though the operation may help materially. I wish that Dr. Vincent and others would try simple incision in some of the stenosis cases, because the operation is so simple, is so easy, and it has worked very well. The only drawback which I see is that pointed out by the house officers, who predict that the procedure is so simple that the medical men will be doing it in their offices.

SPASMOPHILIA—REPORT OF TEN CASES—ETIOLOGY AND TREATMENT.

DR. GROVER: I have heard quite a few of the doctors sitting near me ask what the preparation, laroson, is, and I would like to ask Dr. Webster if he will kindly explain to them what it is.

DR. WEBSTER: Larosan is a preparation of casein and lime. I don't know just the percentage of lime, but there is a considerable amount, and I estimate that it contains about 75% of casein.

DR. HILL: Recently I have made some analyses of larosan, and I find that it contains about 85% casein; I don't know just how much lime.

DR. MORSE: I certainly do not feel inclined to accept Dr. Webster's conclusions. He thinks that spasmophilia is due to the acid fermentation of carbohydrates or to whey. If this is the case, how can we explain the facts that the babies that are on breast milk do not have spasmophilia, and that when a baby with spasmophilia, that is having cow's milk mixtures, is put on breast milk the spasmophilia stops at once. How also can we explain the fact that when these babies are given barley water and sugar the spasmophilia will diminish or stop, to return when a little cow's milk is given. It certainly seems as if these points were very strong evidence against his theory. This is not the place nor is there any time to go into all the evidence which there is to show that spasmophilia is due to some disturbance of the salt metabolism, that is, either to a diminution in the retention of magnesium or calcium or to an increase in that of sodium and potassium. There is considerable evidence which goes to show that in some way this disturbance of the salt metabolism and retention is connected with the parathyroid gland. It seems to me that all we really can say about it is that there is some disturbance of the salt metabolism from some cause or other, and that at present no one knows exactly what this disturbance is, except that it is in all probability a disturbance in the proper relation between calcium and magnesium on the one hand, and sodium and potassium on the other. We have had a very interesting case in the Children's Hospital recently in a girl of eight years, well nourished and in perfectly good condition, who has had attacks of laryngismus stridulus, and in the beginning had typical attacks of tetany, with Trousseau's symptom. Chvostek's

symptom, and so on. We first gave her large amounts of calcium without any effect. Then we gave large amounts of parathyroid without any effect. Then we cut down the sodium and potassium without effect, and then Dr. Hill suggested some trouble with elimination, so we filled her up with water, with the result that the frequency and severity of the attacks immediately diminished. She certainly did not have any signs of acid fermentation, or any excessive amount of carbohydrates in her diet. Dr. Webster has spoken of water retention in these cases. I did not know that this was a symptom of the spasmophilic diathesis. I have seen swelling of the hands and feet in this condition, but it was of the nature of angioneurotic edema rather than of ordinary edema or water retention.

DR. TALBOT: True spasmophilia is certainly a very interesting disease, because we know so little about it, and as Dr. Morse says, the consensus of scientific evidence up to date is that it has somewhat to do with salt metabolism, and apparently the sodium and potassium salts may have something to do with its course. About two weeks ago, we had a very interesting case which has some bearing upon this question. The child came into the hospital with a very violent acidosis. The amount of acetone in the urine was so large that the reaction was almost black. Soda was given, but was not held by the stomach. My house officer gave the patient potassium citrate in large amounts, and within a short time the child had very marked symptoms of tetany; the potassium citrate was stopped, and the symptoms of tetany disappeared. Potassium citrate was again started and the tetany reappeared, to disappear within twelve hours after the potassium was stopped. The tetany was shown in the typical positions of the hands and feet and by the Trousseau's and Chvostek's signs. I do not think we know any too much about the cause of spasmophilia up to date. The relation between the salt metabolism and the metabolism of carbohydrates is so intimate that it is quite conceivable that the proprietary foods, which are composed in large part of carbohydrate, may have an influence on the salt metabolism which may result in tetany.

DR. MILLER: I would like to mention a case which I have recently seen, which happens to be one of those cases which Dr. Morse spoke of, one of those rare cases of tetany in a breast-fed infant, a four-months old infant which came into my service at the Memorial Hospital, with a history of breast feeding whenever it cried, and who had had twenty days previous to entrance what were described as convulsions. It was a very emaciated infant, and when the clothing was removed it went into a tetanic convulsion and cried out, apparently with pain. I gave directions that it should be simply wrapped in blankets, and for two days we followed the case carefully to see whether ordinary milk mixtures would continue the convulsions, and they did. Then we put it on to a casein mixture with maltose and within twelve hours the convulsive seizures ceased and the child was apparently well contented, and to make it brief, the child rapidly improved in every way. I saw the child yesterday for the first time in two weeks, and I hardly knew it, it had improved so much. The fact that it had been previously on breast milk was what interested me greatly, and thinking there might be something about the family incidence of the dis-

case, I had our social worker find out what she could about the habits of the family, and she reported that the parents are Italians, the child irregularly nourished; the mother was a regular daily drinker of beer, and the father drinks in considerable amounts. So we have an alcoholic parentage, with a beer-drinking mother. Whether this had any effect on the milk, I have no knowledge. As far as we were able to determine there were no other factors in the family history that might account for the condition which appeared in the baby.

DR. SMITH: These diseases of salt metabolism are confusing, because we know so little about the application of the knowledge of salt metabolism to the problems of infancy. I imagine it is not unlike the difficulty that was experienced a good many years ago when bacteria were first discovered. Various diseases were known to have a bacterial origin although the actual bacterium causing each disease could not be determined. It seems to me that at the present time a good deal of our confusion arises from the fact that we are considering in a single group several diseases, which subsequently will be separated. We know that the salt metabolism is at fault but not what particular salt or in what way. In this connection it is interesting to remember the work which Sedgwick has been doing on these diseases. It would seem from a certain number of cases there is a definite family incidence. He has been able to find an increased nervous excitability in parents of children with spasmophilia, indicating perhaps that the individual has a peculiar anatomical or physiological makeup, so that it requires only a slight stimulus to cause the explosion. These cases may be of different nature from the others. Also we ought to remember that there are a large number of these cases which respond very favorably to phosphorus and cod liver oil which is always procurable when breast milk is not.

DR. WEBSTER, in closing: I am very much pleased with the discussion which my paper has brought out. There are probably several conditions mixed together in some of the cases so that the diagnosis is not definite, as Dr. Morse has said, but as far as I can tell clinically, these cases might be called spasmophilia, some of them pretty definitely so. I do not think it is fair to compare breast milk and cow's milk. All attempts in the past to compare the two have been failures. In my experience, a baby fed on artificial food always has alkaline putrefactive stools. I believe that almost anyone would grant that a child fed on artificial food containing largely carbohydrates and having sour stools, that that child has acid fermentation of carbohydrates and that this is an undesirable condition. I should not say that acid fermentation was the cause of spasmophilia, but probably was a sign of excessive carbohydrate feeding. I have not gone into theories about the disturbance of inorganic salts, but have discussed these cases as they appeared to me clinically. The disturbance of the salts would not be considered as a cause, but as an effect. One of the most impressive points to me is that the patients have done so well. None of them have had any spasmophilia while fed on a food containing a low carbohydrate content.

FERMENTATIVE DIARRHOEA IN INFANTS.

DR. TALBOT: I have been very much interested in Dr. Hill's paper, in which I think he has pre-

sented a very difficult subject in a very clear way. I personally find it very difficult to draw the line clinically between the cases of indigestion, which we call indigestion due to carbohydrates, and fermental diarrheas, and I wonder what Dr. Hill's criteria were in these cases?

DR. HILL: I do not think that there can be any line drawn between the two. Some of these cases might be called indigestion with fermentation, and some of them carbohydrate indigestion, but I have called a case carbohydrate indigestion or indigestion with fermentation when the baby was not doing well and having too many stools of an acid character.

DR. WEBSTER: I have been very much interested in listening to Dr. Hill's paper, since in the last few years my experience has been that fermental diarrhea is much more common than infectious diarrhea. In fact, infectious diarrhea has been the exception in Portland. Two summers ago, I saw some 60 cases and in my opinion about 50 of them were of the fermental type. I have never published a report of them as I have been anxious to learn more about this subject, and to me Dr. Hill's paper is very instructive. It is not necessary to have acid stools in intestinal fermentation. When you have acid stools I always believed that you have intestinal fermentation, although he says you may have infectious diarrhea. When the stools are alkaline you may have fermentation since a mucous stool is always alkaline. You must have a stool which contains some food residue in order to tell whether there is fermentation. I had supposed that the presence of blood in the stools was a symptom of infectious diarrhea, but I have several times seen blood in the stools in intestinal fermentation, and have in a few cases seen excoriations running up into the anus along with the sore buttocks.

I wish to change one statement I made in replying to Dr. Morse about the stools being acid. I have once in the last few months seen a child with acid stools from fat, and probably here in Boston those stools are more common, that is, the fatty acid stools, because of the use of cream, but practically always when I see acid stools it is after fermentation, in which the diagnosis can be corroborated by the percentages and by the therapeutic test, and I think the odor is different. This is a matter of experience. One thing that I omitted to say in the discussion is that there are different kinds of acid fermentation, which make a difference.

CLINICAL CONFERENCE OF THE NEUROLOGICAL INSTITUTE, NEW YORK.

DECEMBER 14, 1915.

DR. J. RAMSAY HUNT in the chair.

ACROMEGALY WITH EXTREME DEGREE OF EXOPHTHALMOS.

DR. WALTER BAER WEIDLER presented from the first division:

Mr. M. S., aet. 37, Hebrew; occupation, upholsterer. Patient complained of pains in the legs since June 7, 1914, especially in the calves and the

knees, and of a feeling of weakness in the lower extremities when he walks. Aside from this, there was no complaint. He maintained that the symptoms had been in existence about four months before this date, and during that time he had lost considerable weight,—about 30 pounds.

Examination when first seen revealed the typical physical signs of acromegaly in a very early stage, all of them less conspicuous than at the present time. I believe that you will agree with me they are characteristic, plus an additional condition occasionally present, i.e. exophthalmos. We see striking features of his cephalic extremity in addition to the exophthalmos, the protuberant orbital arches, with a luxuriant growth of coarse hair, the enlarged nose and ears and the prognathous jaw, the protruding, overhanging under lip, the enlarged and fissured tongue. The only extremities characteristically enlarged are manual. The fingers are the characteristic sausage shape; the hands themselves are lacking the pads, which are rather thin in the thenar and hypothenar sides. The skin of the fingers lays in longitudinal folds, the nails are pyriform and glistening. His stature is rather characteristic of the disease, and the protruding abdomen and the rounded shoulders being distinctive features. The feet are not particularly large nor is there any evidence yet of the projecting of the os calcis. The pulse rate is from 76 to 84.

In the 18 months that have elapsed since this patient came to the dispensary, the cachexia, if that is the proper name for it, upon which his symptoms are dependent, has gradually increased.

He has not worked for a year because he is too weak. The symptoms that impaired his working capacity came on rather suddenly.

Urine normal; no increased sugar tolerance. Wassermann negative. His eyes became more prominent, began to complain of frontal headaches, and the general physical weakness increased rapidly.

The eye examination by Dr. Holden June 15, 1914, revealed no gross ocular changes.

November 25, 1915, Dr. Holden found the following condition: O2 pupils, right 2.5 mm., left 3 mm.; and the reaction to light and convergence was sluggish. Diplopia at times and restricted movements of eyes upwards. There was well-marked exophthalmos with normal vision, fields and fundi.

My first examination of this patient's eyes was Dec. 6, 1915, just one year and a half after the onset of the disease. O2 pupils, 3 mm.; iridia blue, react to light sluggishly but active to accommodation and convergence, and the tension normal. The corneal sensation was normal in spite of the exophthalmos, which amounts to about 10 or 12 mm. Vision: right 20/201 Left 20/201 Type I. Accommodation 13-30 cm.

The ophthalmoscopic examination:

Right eye: media clear, disc oval 7 by 8 mm., long axis 75°, scleral ring all around, central excavation small, with quite a decided pallor of the papillomacular bundle. The veins are dark and full, vessels long axis 90°.

Left eye: media clear, disc oval 7 by 8 mm., long axis 90°, scleral ring all around, central excavation small, with pallor of the temporal half of the disc, veins dark and full, with well-marked venous pulse, vessels long axis 90°.

The very pronounced exophthalmos makes it quite easy to demonstrate the Von Graefe, Dalrymple,

Stellwag and Gifford signs, generally present in Graves' disease.

There is a marked limitation of movement of the eyes upward and outward, and with little or no power of convergence. The fields taken Dec. 14, 1915, show in the right eye enlargement of the limits for white due to the exophthalmos, but a marked contraction for red and blue, and more especially for green, which is reduced to the 10 mm. circle. There is no scotoma.

The left eye shows the enlargement of the field for white, but a dichromatopsia for the red and blue. This was noted quite often in the first cases seen by Cushing, but has not been demonstrated in his later work. The green is reduced to the 10 mm. circle. There was no true scotoma found, but one was able to show the tendency towards a "fatigue field" in the left eye.

The x-ray plate, made by Dr. Law of the Manhattan Eye and Ear Hospital, showed some enlargement of the base of the sella and also of the posterior clinoid process, which might be considered quite sufficient to explain the changes in the fields. The marked reduction of the green field should be taken as evidence of the earliest degeneration in the optic nerve.

Summary:

1. The gradual onset and progress of the cephalic changes, but more especially of the brows, ears, nose and lower jaw, the protruding abdomen, sloping shoulders, trouble with the feet and hands.
2. The gradual decrease of sexual desire and sexual power, and loss of physical strength.
3. The exophthalmos and changes noted in the field of vision make one think that this is a case of acromegaly without any of the well-marked symptoms, which will undoubtedly be present in a later stage of this patient's disease.

A CASE OF HEREDITARY TREMOR.

Dr. C. BURNS CRAIG presented from the first division an extremely interesting variety of tremor, most probably hereditary. It is especially interesting in that it can be traced through three generations, and is associated with and probably originally caused by alcoholism. The patient states that he first noticed the shaking of his head when he was about six years old; fright, excitement or nervous tension would cause him to tremble all over. He noticed during his first year in school that when he was sent to the blackboard his head would tremble from side to side, which disconcerted him so that he was practically unable to carry out a task before the school. He noticed during his high school work that his hand trembled in writing, although he had gotten along fairly well in his studies, and had been able to keep up with his class. He acquired a taste for alcohol as early as his sixteenth or seventeenth year, and has been addicted to its use ever since, he being now 26 years of age. He has been not only a rather constant drinker, which he thought was necessary for its bracing effect, but indulged in latter years in weekly sprees. Since leaving high school he has been working in a responsible position as a bookkeeper in an insurance office; he was there subjected to a great deal of good-natured gibing because of his infirmity, as the slightest excitability provoked the shaking of the head to a greater degree. Sixteen months ago he contracted venereal infection, which caused him great anxiety, so that he resorted more and more to the use of alcohol.

Since that time the shaking of the head had become so violent that he was too greatly embarrassed to continue in the office. His decision to leave was hastened by the fact that he had been criticized because of his poor writing, the result of his shaking hand. Three weeks ago I saw this patient and advised him that the more vigorous life on a farm, where the less delicate movements of his hands were called for, where there would be a small group of people, with whom he would become intimate, and among whom his embarrassment and self-consciousness would disappear, to say nothing of the more healthful manner of life as compared to an office, would be the ideal future for him. He accepted the advice and went to the farm of an aunt, herself an alcoholic. From this place he returned in a week in a state so lacking in poise that his tremor, which extended from his neck into his trunk, would almost lift him from his chair. During his absence he had proceeded to drink a large quantity of alcohol. He was admitted to the Hospital Nov. 28, 1915. That night he manifested the restlessness and, indeed, violence of an incipient delirium tremens, necessitating restraint. His state of agitation has quieted down since that time, but there has remained a mental state in which both orientation, attention and memory are greatly impaired. In certain phases he presents both hallucinations and delusions. Physically he is a fair, tall, broad-shouldered man of average physique. He has what is ordinarily called a weak face, lacking both vigor and decisiveness. As he lies in bed there are present frequent coarse tremors throughout the neck and trunk, which become accentuated in the presence of strangers. These contractions may be seen in both the muscles of the chest, abdomen, and back. His pupils are equal and round and react promptly to light and in accommodation. The tendon reflexes are all equal and active. His strength is good and coordination observed, although the tremor is increased by intention. There is no nystagmus or ocular trouble. The heart is negative; his blood pressure is 125. The familiar nature of this tremor may be presented as follows:

The patient's grandfather was a steady drinker (see family tree), and had, as long as the patient or his mother can remember, a tremor of the neck. This man had three children, the father of the patient, who was also a chronic alcoholic throughout his life, indulging in frequent sprees, but manifesting no tremor or muscular instability. The patient's uncle was not a drinking man, nor did he have a tremor. He did not marry. The patient's aunt, who remained single, is both a chronic alcoholic and has a marked tremor of the head. In the patient's family there are two boys and three girls; the patient himself manifesting tremor and being a

chronic alcoholic; a sister of 35, who has a constant tremor of the head, and occasionally of the hands, but who does not indulge in alcohol; a sister of 33, who has a constant head tremor, and trembles all over when excited, neither does she indulge in alcohol. In both these sisters the tremor of the neck began in childhood. A sister 30 years of age, who is said to be of a nervous temperament, manifests no tremor. The youngest member of the family, a boy of 22, is said to tremble in an obvious manner when excited. We thus have three members of the family presenting various degrees of a similar tremor, coming from an alcoholic father who had no tremor, but whose sister is also a chronic alcoholic and has been all her life afflicted with a tremor. These two are in turn the offspring of a parent who was both alcoholic and presented a tremor of the neck.

A CASE OF CHRONIC LEAD INTOXICATION.

DR. WALTER CLARK HAUPT, in presenting this case from the first division said that it was particularly interesting inasmuch as none of the usual symptoms of plumbism—lead-line, anemia, basophilia, palsies, arthralgias, arteriosclerosis, or cephalopathy,—were present, and a differentiation between the patient's neurasthenic reaction and symptoms referable to chronic metallic poisoning was difficult.

The patient was admitted to the hospital Nov. 19, 1915. His complaints were: profuse perspiration, pins and needles sensation all over the body, "creeping and crawling under the skin with a sensation as if wind were blowing over the skin while it was burning underneath," girdle sensation, attacks of dizziness and confusion, constant feeling of swaying back and forth, pain in the calf muscles, needle-like pain during urination, constipation, and impaired sexual power.

The patient is a Roumanian Jew, 32 years of age. Has had two attacks of enteric fever at 13 and 16, respectively, but no other serious illness.

At the age of 17 he took up the trade of house-painting, which he followed continuously up to two years ago, and also during the past summer. In his work he used white lead paints extensively, as well as red lead paints and varnish. He handled putty very frequently. He mixed his paints with turpentine or benzine. He admits that he was extremely indifferent in regard to washing his hands or even wiping off some of the paint before eating. He drank moderately and smoked excessively. For the past ten years his bowels have been very constipated, moving only every second or third day after taking a physic.

Ten years ago he married and his wife had four children and one miscarriage. Before marriage he

FAMILY TREE.

Grandfather, alcoholic, tremor of head.

Father, alcoholic.	Uncle, no alcohol, no tremor, single.	Aunt, alcoholic, tremor of head, single.
Sister, 35 years, tremor of head and hands, non-alcoholic.	Sister 33 years, trembles when excited, non-alcoholic.	Sister, 30 years, nervous, excitable.
Patient, 26 years, tremor of head and hands, alcoholic.	Brother, 22 years, trembles when excited.	

was addicted to onanism for nine years, and claims to have had spermatorrhea for a long time. He denies venereal infection.

About five years ago, he had for the first time a sensation of tightness and constriction around the waist. "It felt," he says, "as if someone had tied a tight bandage around my waist, and inside it burned all round,—in front, in back, and at the sides." Similar attacks, which varied in duration, would recur about once in every four weeks. He would bend his body forward, but found no relief, until he pressed the hands on the lower part of the back and hyperextended the trunk; this would decrease the sensation of tightness, and burning was lessened. Four and a half years ago, he began to have sticking pain in the epigastrium, which came on about twice a week. At the same time he would feel a similar pain below the left clavicle and above the left scapula. Six months later the sensation of tightness and burning around the abdomen began to be associated with severe cramps in his stomach, which made him moan and double up with pain.

Three years ago he first noticed that whenever he entered a freshly painted room or whenever he smelt fresh paint his face would break out in perspiration. He remembers also that when mixing paints that drops of sweat would drip down. This occurred, even in the coldest weather. He observed at the same time that his forearms and hands were covered with beads of perspiration. Whenever he had an opportunity, he left his work to get fresh air; this would relieve him and he could breathe easier. He found soon that he perspired more freely over his whole body at all times and wherever he might be. The lower part of his back seemed to perspire more than any other part of the body.

At this time he also first began to have the sensation of creeping and crawling underneath the skin, associated with trembling of his head, limbs, and body, and likewise the feeling of something burning under his skin, while a draft of cold air seemed to blow over the surface. He also began to have frequent retching and eructation of gas, as well as dryness of the mouth and throat, symptoms which were especially marked when he smelled fresh paint.

In this period falls also the beginning of the sensation of swaying backward and forward. He remembers that he first noticed this symptom while riding in an elevator. He felt as if someone had suddenly given him a push from behind and then someone else from in front, and as if this were being repeated over and over again. His heart beat rapidly, and his friends told him that he was pale in the face and perspiring. When he got out on the street he felt dizzy and confused, not knowing exactly which way to turn to go home. He perspired profusely that night and had to have three changes of night clothes. Ever since that time he has constantly had this sensation of swaying back and forth, and when walking on the street has felt as if he were going to fall. He has often had to steady himself against a wall. During these attacks he is quite confused as to his whereabouts, and is seized by a fear of sudden death.

For the past two years he has had attacks of pain on attempting to urinate, coming on about three times a week. Last summer he saw blood in his urine on two occasions.

Two years ago he had occasional diplopia for an indefinite length of time. He remembers that while eating he would see two knives. For the past year he has had frequent nausea after eating and occa-

sional vomiting. Although the patient had insisted all along that he had not done any work for two years and that his symptoms had not been ameliorated, he finally confessed that he had painted all last summer, but had withheld the fact as he was being supported by charity. His symptoms became more pronounced this autumn.

Physical examination shows the patient to be a well-developed, well-nourished muscular man. His weight is 156. His hands and feet were moist and cold. Only a suggestion of moisture over his lumbar region could be noted, although he complained at the time that he was covered with perspiration. During the examination he thought repeatedly that he was going to vomit, and there was considerable retching. Although the room, which did smell of fresh paint, was warm, he complained of the cold. His hands and lips trembled and his whole body shivered. On placing the palm of the hand on the patient's skin, one had the sensation of innumerable mild electric shocks. While testing the muscular power of his lower extremities, the patient was seized with severe cramps of his calf muscles; the gastrocnemii felt as hard as rock and the patient cried out with pain.

Examination of cardio-respiratory system was negative; the pulse was 80, blood pressure 120. The abdomen was negative. The teeth were carious, and there was marked pyorrhea, with the characteristic blue line present and the breath was fetid. There were two dime-sized grayish patches on the gums below the last two molars on either side. A lead line could not be detected. The protruded tongue and the lips were tremulous. The gait was occasionally staggering. On standing, a general tremulousness and swaying back and forth, increased by closure of the eyes, were manifest. There was no tendency to fall in any particular direction.

The cranial nerves were normal. Dr. Holden found an old sclerohoroiditis and myopia, somewhat edematous discs with blurred margins and very narrow arteries.

There was slight tremor of the outstretched hands. The lower extremities were normal, save hyperactivity of the tendon jerks. The only objective disturbance of sensation found was a distinct hypaesthesia and hypalgesia of the legs, beginning below the knees. The superficial reflexes were all normal.

The Wassermann of the reaction blood serum and of the spinal fluid was negative. There was no pleocytosis or excess of globulin in the latter.

His blood count was 4,962,000 red cells and 19,000 leucocytes; hemoglobin 81%. The differential count showed 4% eosinophiles. Gastric contents and feces were negative. A single specimen of urine was found to be normal. A 24-hour specimen, sent to Dr. A. S. Wolf, who examined it by the electrolytic process, showed the presence of a trace of lead.

This patient, with definite neuropathic tendencies, developed, after working many years with lead paints, a girdle sensation, attacks of colic, certain indefinite paresthesiae, headache, dizziness, constipation, nausea and occasional vomiting. He shows none of the usual signs of plumbism, but a trace of lead is found in his urine. It is difficult to differentiate clearly between the patient's neurasthenic reactions and symptoms definitely referable to the presence of lead compounds in his system. It might be argued that patient's symptoms did not develop until ten years after he had begun to handle

pains, and that his condition, one which is apt to develop in an individual of his race and with his sexual history, should be considered a neurosis. Against that may be said that lead may be stored in the system for years without giving rise to any trouble until the metabolism is deranged, and, furthermore, the patient's first symptoms were constipation, attacks of colic and girdle sensation, which are known to result from lead intoxication. Other complaints of the patient, as headache, dizziness, dry throat, painful urination, pain in the back, staggering gait, have been observed in persons exposed for longer periods to the harmful emanations from freshly-painted surfaces, particularly to turpentine.

In view of the demonstration of lead in the patient's urine, which has been called the surest sign of lead poisoning, and of the history of many years of contact with lead paint, as well as the definite onset of symptoms, we must regard this case as one of chronic lead intoxication, many symptoms of which we are unable, in the light of our present knowledge to separate clearly from purely neuros-theic reactions which might be expected in this individual.

SYNDROME OF COMPRESSION OF THE CAUDA EQUINA.

DR. JAMES L. JOUGHIN, from the first division, presented a patient showing evidences of pressure on the cauda equina. The family history of the patient, a male aged 38, is negative, as is his history until the age of 19. At that time he began to suffer from a severe pain originating in the left hip, which extended down the back of the thigh and the outer surface of the leg. At about this time, but he does not recollect whether before or after the onset of these initial pains, he received from a playmate a severe blow in the lower lumbar or sacral region, which knocked him down and resulted in considerable pain and stiffness in that region for the ensuing few days. When 15 years old pain in the sacral region first manifested itself, disappearing on repose, reappearing on assuming the erect posture and becoming extremely severe and lancinating on bending forward or either directly or indirectly jarring the spine. At the age of 19 a severe attack of left-sided sciatica occurred (the first of a series of acute attacks), subsequently to which he limped for a period of six or nine months, and during this time he was unable completely to extend the legs, owing to the severe pain caused in the thigh and sacral region by this manoeuvre. However, recovery was so complete that he enlisted in the army when 21 and received his discharge papers three years later, having experienced very little difficulty with the leg during his term of service. On assuming civil life he again retrogressed and during the two years following his discharge, his condition was similar to that which had existed during his years of adolescence with this reservation, that the pain at times assumed the bilateral type. Following this came an absolute recession of all symptoms for three years, until the age of 30, when he experienced a second acute attack of sciatica, for the first time bilateral, but much more severe in the left leg. A second complete recession of all symptoms then occurred, lasting for four years. During this interval, however, he could produce pain in the sacral region or the hip by coming down heavily on his heels or seating himself in an abrupt manner on a hard chair. At the expiration of this time (age 34) a third

acute attack of sciatica supervened, as the second, bilateral, but differing from it in that the right leg and not the left, was most affected, and this pain and disability has ever since persisted in that member.

Eighteen months ago paresthesiae, "pins and needles" sensations, etc., developed in both lower extremities, but within a few weeks disappeared from the left leg. On the right, however, these "tingling" sensations persisted for months, and now are gradually being replaced by a numb or dead feeling distributed in the same area.

One year ago his sexual power began to decrease, and he is now rapidly becoming completely impotent. Nine months ago he noticed that on days when his paresthesiae were very pronounced, the right side of the penis and of the rectum also became numb. This symptom is also increasing in intensity. He thinks his penis and testes have been slowly decreasing in size. Two months ago his left leg began again to tingle, and sharp shooting pains, at first only occasionally, now several times daily, run from the hip down the center of the back of the thigh and the other side of the leg, a distribution similar to that which all the sensory phenomena have manifested throughout the entire course of the disease. A sensation of "giving away" of his legs, more often on the right, has only recently developed. Walking a few blocks induces this and also intensifies the sensory phenomena. After a short rest he again can properly control his leg and continue his walk without fear of falling. His sphincters have been so far unaffected by the progress of the malady. Only his positive physical findings will be given. He stands preferably with the trunk inclined to the right and with the full body weight thrown on the lower limb of that side. The abdominal reflexes are not obtained, probably due to the obese abdomen. The only abnormality in the tendon reflexes is the absent ankle jerk. On the left this can be brought out by reinforcement, but it cannot be similarly elicited on the right. Once or twice a very slight ataxia of the right leg was demonstrable, but usually this was not evident. Fibrillation has been seen in the right calf. Muscular power is intact.

The objective sensory modification consists of a varying degree of hypesthesia (right side) to all modalities of sensibility, attaining its maximum intensity on the sole and outer half of the dorsum of the foot. The circles of Weber are definitely enlarged in these areas. The intensity of the sensory loss is not always the same, sometimes the hypesthesia is very distinct, at other times less so, nor are the limits apparently always identical, although nearly so. This hypesthesia is sequential in its distribution and it is found in the cutaneous areas in relation to the 5th lumbar and all the sacral segments, though most pronounced in the areas supplied by the 5th lumbar and 1st and 2d sacral segments. Postural sense in the toes of the right foot is also deficient. There is considerable tenderness on percussion over the upper portion of the sacrum and the last lumbar vertebra. The blood and cerebrospinal fluid report were negative.

The x-ray plate revealed an ankylosis existing between the 4th and 5th lumbar vertebrae and also showed a pronounced and extensive shadow in relation to the sacrum and 5th lumbar vertebrae, the lower border of which had a very distinct semi-circular outline. The density of this shadow on the left side was very much greater than on the right.

so much so that it was very suggestive of bone formation.

What the pathological condition here may be is largely a matter of conjecture and cannot be definitely determined until we are enabled to present the operative findings, which we hope to do at a future conference.

Harvard Medical School.

MEDICAL MEETING IN THE AMPHITHEATRE OF THE PETER BENT BRIGHAM HOSPITAL, ON TUESDAY EVENING, MARCH 21ST, AT 8.15 O'CLOCK.

Dr. H. A. CHRISTIAN, president, in the chair.

Dr. Chase: Report with Lantern Demonstration of Good Functional Results Following an Operation for Fracture of the Scapoid Bone, and Dislocation of the Semilunar Bone.

Paper of Dr. L. H. Newburgh, Dr. J. H. Means, and Professor W. T. Porter: Studies in Experimental Pneumonia.

The experiments reported at this time concern the respiration in pneumonia. They have to do with the respiratory difficulties of this disease.

The method used depends on the fact that the carbon dioxide content of the blood increases when an animal breathes in a closed system. By means of a spirometer the quantities of gas respired can be measured. An analysis of a sample gives the quantity of CO₂ at any given time.

The first series of experiments was carried out on cats to determine whether cats with pneumonia respond to the stimulus of CO₂ as normal cats do. For this purpose the animals were divided into three groups: normal cats, cats moderately ill with pneumonia, and cats nearly dead with the disease. From the results it appears that in normal animals with 3% CO₂, the breathing is increased by 98%; in cats moderately ill it is increased by 43%; and in cats nearly dead with pneumonia, the breathing is increased only 7%.

These experiments were repeated using dogs instead of cats. The CO₂ content of the respired air was raised to 5%. Similar results were obtained showing that in pneumonia there is a very marked decrease in the ability of the respiratory center to react to CO₂. The decrease is progressive as the disease advances.

These findings naturally lead to the query regarding the cause of this reaction in the path of the respiratory center. In order to determine what was responsible for the reaction, an attempt was made to investigate experimentally all of the factors likely to influence the respiration in pneumonia. From the first series of experiments, the conclusion may be drawn that the decrease in the ability of the center to react to CO₂ is not due to a mechanical factor. The results from a second series, demonstrated an absence of any parallelism between the amount of consolidation and the extent of the reaction.

The effect of toxins on the respiratory center was investigated in the third group of animals. It was

found that the failure of the center to react to CO₂ was not due to the toxemia, or whatever poisons are produced by the micro-organisms.

In the fourth series, the results were conclusively against any assumption that a chemical substance generated in the lungs was responsible for this reaction.

The lack of oxygen was considered in the fifth set of experiments. Many workers have suspected that there is a close connection between the degree of dyspnea, and the reaction of the respiratory mechanism. The findings, however, were entirely out of harmony with such a view.

In the final series the effect of the vagus nerve on the center was studied. The experiments showed that the difficulty with respiration is apparently the result of stimuli which arise in the lung and pass up the vagus to the medulla. These stimuli in some way injure the cells of the medulla so that they cannot react to the CO₂.

DISCUSSION.

Dr. MEANS: Kymographic studies carried out on a patient with an artificial pneumothorax, have given certain results which substantiate the experimental work just outlined. In this case, the vital capacity had been observed before the onset of the tuberculosis. It was about two and one-half liters. Subsequent to the establishment of the pneumothorax, it was found to be only about one-half this amount. There were no signs of dyspnea, however. With only one lung the patient could increase her ventilation like a normal subject. The great reduction in the lung surface apparently led to no reduction in the curve of CO₂.

Dr. PRABODY: It is clear that this is an exceedingly complicated subject. I wish to congratulate the workers on their splendid results. Apparently they have controlled the experiments from all points of view. This finding of the vagus nerve factor opens up an entirely new field, particularly from the clinical standpoint. The field of the nervous regulation of respiration is a pretty obscure one, and it is especially so to the clinicians.

Dr. COUNCILMAN: This paper has called up two points of interest. One of these is the enormous capacity of the lungs to function efficiently under very great difficulties. Pathological findings repeatedly demonstrate that an enormous proportion of lung tissue may be destroyed without seriously interfering with the respiratory exchange. The second point is that recent work has shown the interest clinicians are now taking in respiration. The clinical and experimental work in this field has already added very materially to our knowledge.

Dr. CHRISTIAN: For a long time clinicians have noted that some patients with pneumonia are relatively comfortable, while others are extremely uncomfortable. No definite relation, however, has been found between the area of consolidation and respiratory distress. It has always been taught that this is to be explained by the amount of toxemia, acting directly on the respiratory and vasomotor centers. The work presented tonight, however, completely upsets this explanation. It leads to interesting speculations as to whether the nervous factor is due to disturbances in the vagal terminations in the lung, or to changes in the trunk of the nerve itself. We are very greatly indebted to these observers for this valuable contribution.

Paper of Dr. A. A. GHOREYEB: Studies of the Renal and Coronary Circulations.

The object of this work has been to determine whether a compensatory hypertrophy of the intrinsic arteries accompanies a hypertrophy of any organ, such as the heart or the kidney. The first experiments concerned the capacity of the average-sized coronary arteries. After two or more years of work with casts made by injecting the vessels with a composition metal, it was found that one gram of heart is equivalent to 0.433 grams of the metal. Since the error in a series of hearts consecutively injected proved to be less than one gram, it became apparent that the method was a safe one to use for experimental purposes.

Lambs' and sheep hearts were used. In the earlier portion of the work, only the hearts from young animals were used. Subsequent studies with older organs demonstrated that as the heart grows larger, the vascular supply (coronary vessels) does not increase at a proportional rate.

In the second part of this work, the effects of disease on the renal arterial system in man were investigated along similar lines. In nephritis the vascular supply of the kidneys was found to be greatly reduced.

(Lantern slides of casts were shown illustrating the vascular supply of hearts and kidneys).

DISCUSSION.

DR. CHRISTIAN: The findings just pointed out regarding the circulation in young and adult hearts, and the fact that hypertrophied hearts have no corresponding increase in vascular supply, may explain why degenerations occur in such cardiac conditions. The same explanation may apply to the decrease in function of nephropathies. It may be that too much emphasis has been laid on epithelial changes, and too little on the circulation in explaining the decreases noted in renal function test.

DR. BARNEY: In the text-books the statement is usually made that an atrophy of the kidney always follows the ligation of the ureter. A hydronephrosis is never discovered in such a case. In a series of animal experiments which I have carried out, however, I found that hydronephrosis always results from ureteral ligation. By means of gelatin injections, it was possible to demonstrate numerous anastomosing veins in the kidney capsules in such specimens. Such anastomoses probably explain the absence of atrophic changes.

In certain animals when the kidneys were decapsulated at the time of the ureteral ligations, the kidneys underwent atrophic instead of hydronephrotic degenerations. The experiments as a whole showed that if the circulation in the capsule (anastomosing veins) was interfered with after the ureter had been tied off, hydronephrosis did not occur.

ERNEST G. GREY, M.D.

NEW HARVARD UNIT.—It is announced that a new surgical unit has been organized at the Harvard Medical School, under the direction of Dr. Harvey Cushing, Dr. Richard P. Strong, Dr. John Warren and Dr. Roger I. Lee. This unit will be composed of twenty surgeons, physicians and bacteriologists, and is intended as a mobile base hospital unit to supply emergencies and fill vacancies in the unit on service at the British base hospital in France.

Book Reviews.

The Obstetrical Quiz for Nurses. By HILDA ELIZABETH CARLSON. New York: The Reiman Company. 1915.

This book is of the same plan as the quiz compends which are published for the use of medical students. This volume in particular is unintelligently compiled and cannot be regarded as a safe book to put in the hands of any nurse.

Principles and Practice of Obstetrics. By JOSEPH B. DELEE, A.M., M.D. Professor of Obstetrics at Northwestern University Medical School. Second edition, large octavo, 1087 pages, illustrated. Philadelphia and London: W. B. Saunders Company. 1915.

The fact that this book has come to its second edition with three printings of its first in two years shows its popularity. It is unquestionably an excellent obstetric reference book.

Curschmann's Text Book of Nervous Diseases. Translated by CHARLES W. BURR, Prof. of Mental Diseases, Univ. of Penn.; Neurologist to the Philadelphia General Hospital. Two vols. Philadelphia: P. Blakiston's Son and Co. 1915.

A review of this text-book as a whole would take more space than we are able to devote to it. It must suffice to state that Curschmann's Text-book of Nervous Diseases has been well known as a most valuable work ever since its publication in German a few years ago. The articles, which are by different writers, are all by men who are recognized as leaders in the study of the subjects upon which they have been asked to write, and men of large practical experience, whose treatment of the subjects given to them has been sane and wise and thoroughly adequate. The section written by Dr. Burr himself, the one upon the diagnosis and treatment of neurasthenia, psychasthenia, hysteria, and borderland mental states, is well worth careful study, perhaps especially in regard to his treatment of the subject of borderland mental states, conditions in which he has had exceptionally large experience. The translation appears to be entirely adequate, and as one would expect, shows practically none of the usual ear marks of a translation from the German. The book is extremely well printed, and the illustrations also, and if any criticism may be made in this regard, it can be only in the nature of a regret that the careful production has made so large a price necessary that the book is not likely to have as wide a circulation among the profession as it deserves.

THE BOSTON Medical and Surgical Journal

Established in 1812

An independently owned Journal of Medicine and Surgery, published weekly, under the direction of the Editors and an Advisory Committee, by the Boston Medical and Surgical Journal Society, Inc.

THURSDAY, APRIL 6, 1916

EDITORS.

ROBERT M. GREEN, M.D., *Editor-in-Chief.*
GEORGE C. SMITH, M.D., *Assistant Editor.*

WALTER L. BURGESS, M.D., } *For the Massachusetts Medical Society.*
FREDERICK T. LORD, M.D., }

COMMITTEE OF CONSULTING EDITORS.

WALTER B. CANNON, M.D. ALLAN J. McLAUGHLIN, M.D.
HARVEY CUSHING, M.D. ROBERT B. OSGOOD, M.D.
DAVID L. ENSMALL, M.D. MILTON J. ROSENBAUM, M.D.
REID HUNT, M.D. EDWARD C. STREETER, M.D.
ROGER L. LEE, M.D. E. W. TAYLOR, M.D.

ADVISORY COMMITTEE.

EDWARD C. STREETER, M.D., Boston, *Chairman.*
WALTER P. BOWEN, M.D., Clinton.
ALGERNON COOLIDGE, M.D., Boston.
HOMER GAGE, M.D., Worcester.
JOEL E. GOLDSWORTHY, M.D., Boston.
LYMAN A. JONES, M.D., North Adams.
ROBERT B. OSGOOD, M.D., Boston.
HUGH WILLIAMS, M.D., Boston.
ALFRED WORCHESTER, M.D., Waltham.

SUBSCRIPTION TERMS: \$5.00 per year, in advance, postage paid, for the United States. \$6.50 per year for all foreign countries belonging to the Postal Union.

An editor will be in the editorial office daily, except Sunday, from twelve to one-thirty p. m.

Papers for publication, and all other communications for the Editorial Department, should be addressed to the Editor, 126 Massachusetts Ave., Boston. Notices and other material for the editorial pages must be received not later than noon on the Saturday preceding the date of publication. Orders for reprints must be returned in writing to the printer with the galley proof of papers. The Journal will furnish one hundred reprints free to the author, upon his written request.

All letters containing business communications, or referring to the publication, subscription, or advertising department of the Journal, should be addressed to

ERNEST GREGORY, Manager.

126 Massachusetts Ave., Corner Boylston St., Boston, Massachusetts.

INDUSTRIAL HEALTH INSURANCE.

REFERRING to our comment on the bill for industrial health insurance in editorials in the issues of the JOURNAL for January 6 and February 24, 1916, we have received a copy of House Bill No. 1015, now before the Massachusetts Legislature. It is a long bill but may be summarized as follows: Every person employed in the Commonwealth for compensation not in excess of one hundred dollars a month, except in the case of employees of the United States, those for whom sick benefits have been otherwise provided and a few others as specified, shall be insured as regards their health in an association to be maintained by contributions to reserve and guarantee funds and expenses by employers at the rate of two-fifths, employees, two-fifths, and the Commonwealth, one-fifth. The insurance is to be handled by three commissioners, appointed by the Governor for six-year terms of office, each commissioner to devote his entire time to the

duties of his office, the chairman to receive a salary of \$4,500 and the other two commissioners \$4,000 each, the secretary receiving a salary of \$3,600.

Thus, exclusive of the expense to the State of the one-fifth of the cost of the actual insurance, an unknown sum, the bill calls for an expenditure of \$16,100 for salaries, not including office expenses as appropriated by the Legislature. Benefits shall be paid for sickness or accident or death not covered by workmen's compensation, and these benefits must be provided for: Medical, surgical and nursing attendance; medicines and surgical supplies; cash benefits; funeral benefits. All necessary medical, surgical and nursing attendance and treatment shall be furnished from the first day of sickness during the continuance of sickness, but not to exceed 26 weeks of disability in any consecutive 12 months, including medical, surgical and obstetrical aid to insured women during confinement. The carriers of the insurance, i. e., the society or association, subject to the approval of the commission, shall make organized provision for medical, surgical and nursing aid by duly qualified physicians, surgeons and nurses. Insured persons shall be supplied with all necessary medicines, surgical supplies, dressings, eye glasses, trusses, crutches and similar appliances prescribed by the physician or surgeon, in cost not to exceed \$50 a year. Hospital treatment shall be furnished if required.

The relation of the medical profession to the detailed working of such a measure remains to be planned, as we pointed out in our previous editorial. Of course the profession should be represented, but whether on the commission, or a special advisory board, or through local medical associations, remains to be seen. To say that the bill should guarantee a high standard of medical aid is self-evident. The matter needs further study. The progress of a similar health insurance bill in New York State is shown by a news item in another column.

PECULIAR SOURCES OF PLUMBISM.

WE are all familiar, of course, with the clinical picture of lead poisoning, or at least we have it near enough to the surface of consciousness to produce at a very short notice; but we seldom figure upon it in making differential diagnoses. Excepting always industrial workers

who handle this metal, we rarely run across this toxemia in ordinary practice, and such cases as we do find are so commonly due to a tainted water supply that a number of persons are affected at once, facilitating considerably the diagnosis. The fact should not be overlooked, however, that lead is a very common metal and apparently very easily absorbed by the system. In the *Lancet* for Oct. 2, 1915, Dr. Hall reports two interesting cases from his own practice. One of these was a factory hand whose work had nothing to do with lead and whose water supply was found to be innocent; it was finally discovered that he had been consuming large quantities of a soft drink which he bought at a store near his work. This drink was brought up from the cellar through a lead pipe, and being somewhat acid ate away the lead. On analysis it was found to have one grain of lead to the gallon.

The other case was much more unusual. The patient was diagnosed correctly, the water supply of his house was found to have a slight trace of lead, this was remedied and he passed from observation. About a year later he was sent to the writer with greatly aggravated symptoms, including some nervous ones. The patient himself had naturally given up the idea of plumbism as his condition was not ameliorated with the correction of his water supply. Dr. Hall assured him, however, that the diagnosis was absolutely positive and, after some search for the source of the trouble, it was found in the patient's vest pocket. He had been accustomed to keep in a certain pocket of every suit of clothes a quantity of small shot which he used on an air-gun against depredating cats. He had been accustomed to thrust his thumb and forefinger constantly in this pocket and finger the shot. On turning the pocket inside out a large quantity of fine dust was discovered which proved on analysis to be almost pure lead. A complete verification of this assigned cause was found in the improvement and final cure of the patient.

All this should teach us not to think in conventional lines. It is customary, if the possibility of lead poisoning occurs to us in examining a patient, to enquire into his occupation, and if he does not handle lead at all to dismiss the idea unless the picture becomes very plain. Even in that case the tendency is to examine the water supply and, if we find no lead there, conclude that it must be some obscure neurological

trouble. It seems probable that there may be other sources of plumbism as odd as the ones above and contributions of them to the literature would be valuable. Such a case report appears in the proceedings of the New York Neurological Institute on page 508 of this issue of the JOURNAL.

SMALLPOX AND ANTI-VACCINATION LEGISLATION.

THERE is at present pending before the Massachusetts General Court a proposed bill providing the repeal of the statute law requiring pupils and attendants of the public schools in this Commonwealth to be vaccinated, and permitting unvaccinated children to attend the public schools on written request of a parent or guardian, except in times of epidemic.

It is disappointing to chronicle the recrudescence of this piece of anti-vaccination legislation, which in effect would establish in this community the "conscientious objector" principle that has operated so injuriously in Great Britain. It is discouraging, also, that in spite of previous defeats of similar measures, and in spite of the unanimous adverse recommendation of the State Department of Health and of many physicians present both as individuals and as representatives of the Massachusetts Medical Society, this bill was, on March 23, ordered to a third reading by the House of Representatives on a roll-call vote of 127 to 105. It would seem that the arguments which have been so often adduced on this subject should not need annual repetition, yet it appears necessary to continue indefinitely the fight for intelligence over ignorance as the only means of safety.

In another column of this issue of the JOURNAL, we take the greatest pleasure in publishing an article on "The Truth about Smallpox and Vaccination," by Dr. George W. Gay of Boston, who has for years been a staunch defender of vaccination and has devoted a large share of his energy and time to the subject of medical legislation, acting in the interest of the medical profession and of the true public welfare. The arguments on the subject of vaccination and smallpox cannot be better presented than in his words; and we cannot do more than to direct the attention of our readers to them and to

trust that they may come also to the notice of, and may carry conviction to, some of those who are still misled upon the subject. The passage of the bill now pending before the Legislature would be a calamity for the community, and it is earnestly to be desired that this measure may be again defeated like others that have hitherto preceded it. All physicians having the welfare of the public genuinely at heart should take every step in their power to ensure its defeat.*

THE ALCOHOLIC IN COURT.

In another column of this issue of the JOURNAL we publish an article by Dr. Anderson on the alcoholic in court, who presents a problem, the magnitude of which is hardly appreciated by the profession at large. In the Boston Municipal Court last year there were between thirty-eight and forty thousand arrests for drunkenness. The fact that a great many of these individuals were repeated offenders shows that they furnish a serious social problem, not to mention the needs of the individuals themselves from a medical standpoint.

Attention has already been called to this problem by Dr. Neff and others, but as yet it has not received sufficient legislative recognition. The Norfolk State Hospital is a small institution and the number of cases that can be handled there is relatively small; and, moreover, only the more promising patients are accepted. Chronic cases are sent to the State Farm and to the House of Correction for short periods and serve innumerable sentences. These unfortunates, after a brief period of restraint, are released unaffected into the community, only to return soon again to court and to detention and thus endlessly repeat the vicious circle. No purpose is served by their arrest, for neither are they made better nor is society adequately protected.

In his article Dr. Anderson has made a study of one hundred of these cases, selected at random, with the idea of determining what they are and what they need. This article was written with the intent of aiding a movement now taking shape for proposed legislation. The consideration of measures for the care and treatment of alcoholics is now in the hands of a legislative committee. The crux of the problem is the present lack of provision of hospital care for

the cases which must have it if their condition is to be altered. A great number of deteriorating and defective alcoholics also need prolonged attention for a matter of years rather than weeks. What is most to be desired is an extension of the hospital and colony plan so as to include those cases for whom prolonged detention is desirable. Punishment for such persons is futile; they are medical problems and should be treated as such.

MEDICAL NOTES.

INDUSTRIAL HEALTH INSURANCE.—Keen interest in health insurance was manifested by the medical profession at the hearing, in Albany, on the Mills Health Insurance Bill on March 14. At this hearing Dr. James Rooney, of the New York State Society, said that although the bill was opposed by its Council, he had been instructed to ask for a commission to study the subject. Moreover, he expressed the hope that there might be cooperation between the medical profession and legislators so that the bitter misunderstanding which occurred in England might be avoided.

Among other speakers, Dr. Samuel Kopetsky felt that the law ought to contain provisions which would guarantee a high standard of service and representation of the physicians, while Dr. Emil Altman, of the Eastern Medical Society, and Dr. Eden V. Delphey of the American Economic Alliance, urged that the patient should have a free choice of doctor. Dr. Alexander Lambert, chairman of the social insurance committee, appointed by the American Medical Association, said that this body "realized that the health of the individual is an absolute essential to his welfare in this country. . . . Any scheme which will promote health and increase his efficiency as a healthful person is of interest to the American Medical Association. In conclusion he urged that the legislators give this "more thorough consideration and go over it from one end to the other and bring forth a law which will be of the greatest benefit both to the physicians and to the people among whom they shall work."

UNITED STATES PUBLIC HEALTH SERVICE EXHIBIT.—The exhibit of the United States Public Health Service at the Panama-Pacific International Exposition, is described in detail in a recent publication, Supplement No. 27. The exhibit was prepared with the idea of presenting in a popular and comprehensive way, easily understood by the general public, the latest methods of preventing the common communicable diseases. Enlarged models of the various insect transmitters of disease, such as the fly, mosquito, flea, tick and louse, attracted great at-

* Since the above was in print the anti-vaccination bill has happily been defeated in the House of Representatives, which refused its engrossment by a vote of 120 to 103.

tention and were, as a rule, closely studied by the majority of visitors. Some of the features of especial interest to the medical profession included a series of glass models illustrating the stages in the life cycle of the *Plasmodium vivax* and models of plants with methods of chemical disinfection of water to prevent the transmission of disease, together with data regarding the cost of operation of such plants and the outfit required for collecting samples and making bacteriological analyses.

EUROPEAN WAR NOTES.

CHOLERA IN BELGRADE.—Report from Athens by way of London on March 16 states that Asiatic cholera has again become epidemic in Belgrade, Serbia, where 50 cases with 30 deaths are said to have occurred daily for some time past.

RETURN OF THIRD HARVARD SURGICAL UNIT.—The members of the Third Harvard Surgical Unit have recently returned safely to Boston after their service of six months at a British base hospital in France. Prior to their departure from that country a dinner was given them by the leading medical officers of the British Expeditionary Force. At this dinner addresses were made by Col. Sir Bertrand Dawson, Col. Sir Almoth Wright and General Sawyer, director general of the medical services. Dr. David Cheever, chief of the retiring Harvard unit, responded in its behalf.

FRENCH RED CROSS.—Recent report from Paris states that the French Red Cross now has 66,449 nurses on active service in the field and in hospitals. Two other similar organizations in France, "Les Dames Françaises" and "Union des Femmes de France," have 4,400 nurses and over 700 hospitals. There are 288 Red Cross hospital buildings in Paris alone. Twenty-two Red Cross nurses during the war have died of wounds or disease, one has received the Cross of the Legion of Honor, and 123 have been awarded other crosses and medals.

AMERICAN UNIT AT BERLIN.—Report from Berlin, by way of London, states that on March 28, there arrived at Berlin an American Unit of four physicians who are to be attached to the United States Embassy and will devote themselves to the inspection of German prison camps. The members of this unit are Dr. D. J. McCarthy and Dr. Alonzo E. Taylor of the University of Pennsylvania, and Dr. S. W. Irwin and Dr. J. T. Webster of Johns Hopkins University.

AMERICAN WOMEN'S WAR HOSPITAL.—We recently have received from Dr. D. Pearce Penhallow of Boston, now serving as chief surgeon and administrative officer of the American Women's War Hospital at Paignton, South Devon, England, an analyzed report of the second thousand

sand cases treated at that institution, representing the discharges from the Hospital from April 3 to December 8, 1915. A similar summary of the first thousand cases was published in the issue of the JOURNAL for December 23, 1915.

Of the second thousand, 732 were surgical cases, of which 571 were traumatic and 161 non-traumatic. Of the traumatisms 547 were wounds and 24 were miscellaneous injuries, chiefly sprains. Of the wounds, 254 were infected, 2 with gas bacillus, none with tetanus. Sixty-six wounds contained foreign bodies, of which 54 were removed by operation. There were 160 fractures, 11 of the skull, 6 of the jaws, 7 of the trunk, 95 of the upper extremity and 41 of the lower extremity. Of other complications, nerve injuries occurred 13 times and synovitis 6 times. A total of 221 operations were performed, including 27 amputations. Of non-traumatic surgical conditions there were 25 hernia, 18 frostbites, 15 cases of hemorrhoids, 14 of otitis. Of 280 medical conditions, 93 were infections, of which 43 were dysentery and 19 rheumatic fever. Of non-infectious conditions, there were 48 cases of debility and 28 of gas poisoning. Of the surgical cases 63.8% were cured and of the medical cases 63.4%. There were five deaths of patients, one each of strangulated hernia, cerebral abscess, cerebral laceration, secondary hemorrhage and nephritis. In general these figures run closely parallel to those of the first thousand cases, but it is to be noted that 72 cases were invalidated out of service in the second thousand as against 35 in the first. Of the admissions during the period covered, the majority were from Flanders and a few from the Dardanelles.

AN AMERICAN SURGEON IN FRANCE.—Report from Paris states that Dr. Joseph A. Blake of New York, formerly professor of surgery in the University of Columbia, has been appointed chief of the surgical center in the Department of the Seine and the Oise. This position places him in charge of six military hospitals. During the first year of the war Dr. Blake was chief surgeon of the American Ambulance Hospital at Neuilly.

WAR RELIEF FUNDS.—On April 1, the totals of the principal New England relief funds for the European War reached the following amounts:—

Belgian Fund	\$109,450.01
Allied Fund	70,880.40
French Wounded Fund ...	66,285.58
British Imperial Fund	51,172.86
French Orphanage Fund ..	36,784.54
Polish Fund	27,563.92
Surgical Dressings Fund ..	22,576.17
Italian Fund	16,540.70
P. S. D. Fund	7,111.45
Allies' Tobacco Fund	1,135.50

BOSTON AND NEW ENGLAND.

THE WEEK'S DEATH RATE IN BOSTON.—During the week ending April 1, 1916, there were 245 deaths reported, with a rate of 16.80 per 1,000 population, as compared with 262 and a rate of 18.25 for the corresponding week last year. There were 35 deaths under one year as compared with 28 last year, and 71 deaths over sixty years of age against 81 last year.

During the week the number of cases of principal reportable diseases were: Diphtheria, 45; scarlatina, 70; measles, 167; whooping cough, 44; typhoid fever, 4; tuberculosis, 44. Included in the above were the following cases of non-residents: Diphtheria, 9; scarlatina, 17; whooping cough, 2; tuberculosis, 5.

Total deaths from these diseases were: Diphtheria, 5; scarlatina, 3; whooping cough, 2; measles, 5; tuberculosis, 19. Included in the above were the following deaths of non-residents: Diphtheria, 1; scarlatina, 3; tuberculosis, 2.

ST. MONICA'S HOME.—The recently published report of Saint Monica's Home for sick colored women and children calls attention to the need of that modest and worthy institution for help in the completion of an extension to the Home begun some months ago. The report states that \$2,000 only is required to finish the necessary alterations, and asks that subscriptions may be received. The capacity of the Home will then be increased to fifteen beds which, with the twelve fresh air beds in use, will make a total of twenty-seven beds.

WOMEN MEMBERS OF HEALTH BOARDS.—The Massachusetts State Senate has recently passed to a third reading a bill permitting women to serve as members of local boards of health in this Commonwealth. The vote stood 16 to 15.

BOSTON CITY HOSPITAL.—A meeting in the interest of medico-social work at the Boston City Hospital is to be held in Vose House on Thursday, April 6, at 4 P.M. The principal speaker of the afternoon will be Dr. Alexander Lambert, for many years a director of the social service department of Bellevue Hospital, New York City.

MEASLES EPIDEMIC IN BROCKTON.—The Brockton Board of Health has reported over 500 cases of measles since the outbreak first occurred. A rule which holds force in a Montello school to the effect that pupils suffering from colds, who have not had measles, are not permitted to attend school, it is hoped may assist in preventing the further spread of the disease in that section.

SCARLET FEVER IN NORWOOD.—The number of cases of scarlet fever reported in Norwood has reached 21 and, in an effort to prevent the further spread of the disease, schools and churches have been closed and public meetings prohibited.

Correspondence.

A RARE DANGER OF ETHER ANESTHESIA.

PHILADELPHIA, PA., March 20, 1916.

Mr. Editor: In my *Ether Day* address on "The Dangers of Ether as an Anesthetic,"¹ I failed to note one rare, but important, danger, to which a correspondent has just called my attention. The reason why it did not occur to me was that I had never personally experienced, nor heard of, any trouble such as my correspondent describes. His personal case is as follows: He was operated upon at a large hospital by one of its best surgeons. The anesthetist, however, was a medical student of little experience and evidently more interested in the operation than in his duties as an anesthetist. He carelessly poured a quantity of ether into the patient's right eye. Unfortunately the patient was blind on the left side. Naturally he struggled. This was, again unfortunately, mistaken for resistance to the anesthetic and still more ether was forced upon him. The result was a "severe burn to the eye, with the formation of an ulcer, blindness for six weeks and glasses ever since."

My correspondent writes that he is cognizant of another similar case.

My own anesthetists almost always have been careful to avoid any such accident, and in addition to that have had a bowl of warm boric acid solution at their elbow. From time to time they have bathed the eyes so as to protect them even from the vapor of ether, and very often have put a pledget of absorbent cotton wet with the boric acid solution on the eyes, during the administration of the anesthetic.

Yours very truly,

W. W. KEER, M.D.

COCCYGODYNIA AS A MANIFESTATION OF SYPHILIS.

BOSTON, MASS., March 21, 1916.

Mr. Editor: To suspect syphilis as a common cause of this painful complaint would be manifestly an exaggeration of the possibilities. At the same time it is wise to keep an open mind on the subject.

The occurrence of this symptom in obscure cases, which later I have proved to be unrecognized syphilis, has happened a sufficient number of times to make the matter more than a coincidence in my opinion. Unexplained "neurasthenia" has of late been proved to be unrecognized syphilis more than once. It has been found that patients suffering with pain in the back of the head and at the "base of the brain," seemingly typical neurasthenics, are really suffering from high vertebral syphilis.

The probable explanation of these cases of coccygodynia is similar: they have a definite pathologic process to account for their pain. The coccyx is a "bone of stress," similar to the tibia, and we are dealing with a true osteo-periostitis, often started up in these cases by a *fall or blow*, so often the history in specific bone troubles. Combined rectal and external palpation gives bone pain, which can be compared in every way with that of the pain of pressure over specific tibiae.

Very truly yours,

WILLIAM PEARCE COUES, M.D.

ERRATUM.

We regret exceedingly that, by an inadvertence in proof reading, the word "cows" was printed instead of "horses" in Dr. Walcott's article in the issue of the *JOURNAL* for March 9, 1916, (Page 338, column 2, line 14). The clause in question should read, therefore: "we were able to verify the diagnosis by means of one of the horses."

¹On October 16, 1915. See *BOSTON MEDICAL AND SURGICAL JOURNAL*, December 2, 1915.

APPOINTMENT.

DR. JOSEPH J. O'BRIEN, of Dorchester, Mass., has been appointed medical inspector in the Boston public works department in succession to Dr. Arthur H. Davidson.

NOTICE.

PHILADELPHIA ACADEMY OF SURGERY. THE SAMUEL D. GROSS PRIZE OF FIFTEEN HUNDRED DOLLARS.—The conditions annexed by the testator are that the prize "shall be awarded every five years to the writer of the best original essay, not exceeding one hundred and fifty printed pages, octavo, in length, illustrative of some subject in surgical pathology or surgical practice, founded upon original investigations, the candidates for the prize to be American citizens."

It is expressly stipulated that the competitor who receives the prize shall publish his essay in book form, and that he shall deposit one copy of the work in the Samuel D. Gross Library of the Philadelphia Academy of Surgery, and that on the title page it shall be stated that to the essay was awarded the Samuel D. Gross Prize of the Philadelphia Academy of Surgery.

The essays, which must be written by a single author in the English language, should be sent to the "Trustees of the Samuel D. Gross Prize of the Philadelphia Academy of Surgery, care of the College of Physicians, 19 S. 22nd St., Philadelphia," on or before January 1, 1920.

Each essay must be typewritten, distinguished by a motto, and accompanied by a sealed envelope bearing the same motto, containing the name and address of the writer. No envelope will be opened except that which accompanies the successful essay.

The Committee will return the unsuccessful essays if reclaimed by their respective writers, or their agents, within one year.

The Committee reserves the right to make no award if the essays submitted are not considered worthy of the prize.

WILLIAM J. TAYLOR, M.D.
JOHN H. JOPSON, M.D.
EDWARD B. HODGE, M.D.,
Trustees.

SOCIETY NOTICES.

NORFOLK SOUTH DISTRICT MEDICAL SOCIETY.—Meeting for medical improvement at United States Hotel, Boston, Thursday, April 6, 1916, at 11.30 A.M.

Reader: Beth Vincent, M.D., of Boston.

Subject: "Transfusion and Splenectomy in the Treatment of Pernicious Anemia."

For F. A. Bartlett, M.D., of Norfolk Downs.

F. H. MERRIAM, M.D., *Secretary*.
South Braintree, Mass.

THE HARVEY SOCIETY.—The tenth lecture of the series will be held at the New York Academy of Medicine, 17 West Forty-Third Street, on Saturday evening, April 8, 1916, at 8.30, by Professor Stanley R. Benedict, Cornell University. Subject: "Uric Acid in Its Relations to Metabolism."

MASSACHUSETTS GENERAL HOSPITAL CLINICAL SOCIETY.—Meeting on Monday, April 10, at 7.30 P.M., Out-Patient Building amphitheatre.

1. Demonstration of Cases.

2. Medical Missions and Opportunities in China, Armenia and Other Parts of the World. Illustrated by lantern slides. Mr. Brewer Eddy.

Physicians, surgeons and students are cordially invited.

ELLIOTT C. CUTLER, M.D., *Secretary*.

THE MASSACHUSETTS THERAPEUTIC MASSAGE ASSOCIATION.—The next meeting will be held at the Hotel Brunswick (Room G), at 5 P.M., Tuesday, April 11,

Dr. J. Baptist Blake, Surgeon, Boston City Hospital, Assistant Professor of Surgery, Harvard Medical School, will address the society on "Massage and Mobilization in the Treatment of Fractures."

Members of the medical profession are invited.

DOUGLAS GRAHAM, M.D., *President*.
Hotel Brunswick, Boston, Mass.
MRS. MABEL F. WALKER, *Secretary*.
115 Cedar Street, Malden, Mass.

PETER BENT BRIGHAM HOSPITAL.—There will be a medical meeting in the amphitheatre of the Peter Bent Brigham Hospital on Tuesday evening, April 11, at 8.15 P.M.

PROGRAM.

1. Demonstration of Cases.
 2. A Clinical Study of the Secretions of the Digestive tract. Dr. Thomas R. Brown of Baltimore.
- Discussion by Drs. W. B. Cannon, E. P. Joslin, and J. H. Pratt.

Medical students and physicians are cordially invited. Telephone Brookline 5260.

Any visitors may be on telephone call if their names are left at the front office of the Hospital.

RECENT DEATHS.

DR. GRANVILLE PRIEST CONN, who died on March 24, at Wayne, Pennsylvania, was born in 1832. During the Civil War he served as assistant surgeon of the Twelfth Vermont Regiment. Later he settled in the practice of his profession at Concord, N. H., where in time he became a member of the State Railroad Commission and president of the New Hampshire Medical Society. He had published a history of New Hampshire surgeons in the Civil War.

DR. LEON LABRÉ, who has died recently at Paris, was born at Merleauville, France, in 1831. He graduated from the College of Argenta and the Lyceum of Caen and for many years practised his profession in Paris. He was a member of the French Institute and of the Academy of Medicine, honorary surgeon to the Paris hospitals, a former president of the Society of Surgery at Paris, a commander of the Legion of Honor, a senator and president of the Council. He was also commander of several foreign orders, and the author of many works on medical subjects.

DR. FRANK J. LUTZ, who died of cardiac disease on March 24, at St. Louis, was born in that city on May 24, 1855. After graduating from St. Louis University, he received the degree of M.D. from the St. Louis Medical College, and in 1876 settled in practice in his native city. He was professor of surgery in the medical department of the University of St. Louis and had served as surgeon-in-chief and consulting surgeon at various local hospitals. He was a member of the Missouri State Board of Health and for several years was surgeon general of the Missouri State Militia. He was a member of the American Medical Association, the American Surgical Association, the Missouri Medical Association, the St. Louis Surgical Society and the St. Louis Medical Society.

DR. EZRA ALLEN HOBBS, a retired Fellow of the Massachusetts Medical Society, died at his home in Framingham, March 23, aged 70 years. He was born in Berwick, Me., and was educated at the Medical School of Maine, taking his degree in 1860, and at Bellevue Hospital, New York. After practising in New York, Boston and Peabody, he settled in Framingham and was town physician for thirty years, and was a medical examiner. He leaves his wife and one son.

DR. HORACE P. BARTLETT, who died on March 29, at North Brookfield, Mass., was born in 1836 and had been a practitioner of dentistry in that town for nearly sixty years. He is survived by one daughter and two sons.